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ILLUSTRATED

BOTANY

CONTAINING

A FLORAL DICTIONARY,

AND A

GLOSSARY OF SCIENTIFIC TERMS

ILLUSTRATED WITH NUMEROUS ENGRAVINGS.

BY JOHN B. NEWMAN, M.D.,
AUTHOR OF VARIOUS WORKS ON THE NATURAL SCIENCES.

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PREFACE.

THAT the study of nature tends to expand the mind, and create an increasing thirst for knowledge, rendering it eager to make new acquisitions, is a fact abundantly exemplified in the experience of our own department. Those who have been led to examine the animal kingdom, both in its mental and physiological aspects, become anxious to explore the mysteries of the vegetable, secure of finding nature every where bountiful in her gifts, and that the contemplation of her as she presents herself in the minute as well as the vast, will but increase their wonder and admiration; and it is for the purpose of thus satisfying the desires of our friends that the present work is offered to the public. Intended for those who have no previous knowledge of the subject, the aim has been, not only to make it simple enough to be understood without other instruction, but also, by means of ample illustration, in the way of facts and anecdotes, to keep up and gratify curiosity to the end. The principles of the science, together

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with a thorough exposition of the system of Linnæus, and the outlines of that of Jussieu are given; care being taken that the facts, as stones, should be well joined together by the cement of theory, so that the whole should form a well-proportioned and enduring structure. Engravings were required to assist the learner, and for that object there is a profuse number. The ten chief medicinal plants of the United States are figured, and, together with their botanical description, is added an account of their properties. Aware that a work of this character would be peculiarly acceptable to youth, we have endeavored to render it still more inviting by the addition of the Meadow Queen's songs, with the necessary alterations, they being unequaled for fixing in the young mind the Linnæan classes. And with the hope that it may be as valuable to the child as to the parent, to the pupil as the teacher, it is submitted to the public.

S. R. Wells

Clinton Hall, 131 Nassau street, New York.

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BOTANY FOR YOUNG PEOPLE.

FIRST CONVERSATION.

Laura. Sister, what kind of flowers are these?

Emily. I have never examined them particularly enough to discover their name. But you must not gather any of them as they are poisonous.

L. If you do not know their name and have not paid much attention to them, I should like to know how you are aware they are at all dangerous?

E. It will be a means of showing you Laura, how a very little knowledge is of great use sometimes. I knew the nature of the flowers from a rule framed by botanists, which says, that all plants with five stamens and one pistil, with a dull colored lurid corolla, and of a nauseous sickly smell, are always poisonous. Many a life has been spared and much trouble prevented by simple attention to this rule.

L. But may there not be other methods of judging plants? In reading a book lately, I was very much interested in the account of a starving traveller, who at his greatest need found some plants, the roots of which he dug up, but was afraid to eat until he had given a part to some animals that were near him; after they had eaten he had no more scruples, and freely satisfied his hunger. Would not such a plan be better than printed rules, and much easier besides?

E. A more unsafe method of proceeding can hardly be imagined. Our common barnyard fowls eat without danger the seeds of many plants that would be fatal to man. The nature of the inferior animals differs much from men, for hogs and horses will fatten by eating arsenic. Rely upon it, there is no regal or rather lazy-folks-road to knowledge, and expedients, similar to the one you have mentioned, show a lack of information instead of its possession.

L. As he did not know the name of the plant, I cannot think of any other way of finding out whether it was safe to eat or not.

E. There are, however, many other modes, in instance of which I may mention a story that is related about the expedition sent some time since with the view of discovering the spot where the celebrated La Peyrouse was shipwrecked. The whole of the crew, from the necessary confinement produced by the length of the voyage, became afflicted with scurvy, and were suffering greatly, when prompt relief was afforded by the use of an unknown plant of the Cruciform family that was discovered on the coast of New Holland by a botanist attached to the expedition. As the Cruciform family is in all its branches anti-scorbutic, he became aware the moment he met with a cross-shaped flower, which is the distinguishing mark of that family, that he had found a means of cure, though he could not tell the name of the plant. Had the traveller you speak of understood botany, he need not have had recourse to the lower animals to discover the properties of his roots.

L. But if there were no flowers to be seen could he tell in that case?

E. Most likely, for there are other marks which you will find out when you proceed. as I hope you will, in the study of this science.

L. I have never felt as if I should like to study it. There are so many hard names, I feel certain I could not learn them all. Julia Williams has been studying botany a long time, and yet even now, when she comes to a hard word has to look in her glossary to find out its meaning. I have seen her perplexed in this way many and many a time.

E. Which trouble arises from the fact that she does not learn her subject thoroughly as she proceeds. Persons of her disposition are always poor scholars, and will inevitably remain so till cured of such wretched habits. It is not because science is so difficult, but merely because they are too indolent. Be always sure to study the technical terms of any branch you commence till you perfectly understand them; do this in botany and it will ensure you a rapid and easy progress. Such a method of proceeding is the only real test of good scholarship.

L. I can easily see even now that you are right, for if I was called on at this moment to apply the rule you give relative to poisons, I could not do it, as I do not even know what a corolla is.

E. It is the painted part of the flower often called the blossom. In the pink before us, (fig. 1.) the flat variegated portion with the claws attached to it is called the corolla, *a*. Inside the corolla you may perceive a set of upright threads with caps on them: these are the stamens, *b.*; and in the centre of all are the pistils, *c*. The whole is set in a cup called the calyx, *d*. The end of the stalk, at the point of attachment of these organs, is called the receptacle or receiver of the rest. Now, Laura, I wish you to mention the names of the several parts as I take the pink to pieces. And to commence, what is this?

L. The outermost of all next the receptacle? that is the calyx, *d*.

E. It is in fact nothing but the termination of the green covering or bark of the stem or stalk. When it consists of separate parts each leaf is called a sepal. The name is derived from the Latin, *calyx*, a cup. What is this?

L. The colored part or corolla, *a*.

E. As the calyx was the termination of the outer bark, so is this of the inner. Its leaves are called petals. The name is derived from the Greek, meaning a crown. What are these?

L. The stamens: there are ten of them.

E. Each one is divided into two parts. The longest portion is called a filament, 1, from the

Latin, *filum* a thread. The cup is the anther, 2, or pollen box. What are these ?

L. The two pistils ; they are the innermost of all.

E. Each pistil is divided into three parts; the stigma, 1 ; style, 2 ; and germ, 3.

L. Can you tell of what use so many parts are ?

E. Yes. After the blossom opens, if you watch carefully, you would perceive the little anthers become full of a yellowish powder called pollen, from which comes their name of pollen-boxes. The final object of this pollen is to be shaken on the stigma or top of the pistil. After it is shaken on it, part of it pierces the germ or seed case at the base of the pistil, and except this germ, in most cases, the other parts having now fulfilled their offices, drop off; the seed case or germ is meanwhile enlarging, and continues increasing in size until the seeds are fully ripe. These seeds with their coverings are termed, in the language of botany, fruit. Will you read from this page Flints beautiful comparison on this subject ?

L. He says that the analogy of the world of animal life is still preserved, and that the male flowers, as the stronger and bolder sex, are drawn by the impulses of nature to pay court to the feebler and more delicate female. The male stamina, with their gaily painted hats, bow around the female pistil as beaus about their belle. Each, in turn, is permitted to come in contact with the fair, and as the contact takes place, the golden pollen is shaken upon the pistil and the stamen retires to give place to the next that offers the same homage. What does it mean here when it speaks of male and female flowers?

E. From the pistil nourishing the fruit in its bosom it is considered as the mother, and bears a Greek name signifying wife, *Gynia*, while the stamens that stand by and guard her, are termed husbands, *Andria.* Darwin makes a very pretty allusion to this in his poetical description of the Meadia, or American Cowslip:

"Meadia's soft chains fine suppliant beaus confess,
And hand in hand the laughing belle address,
Alike to all she bows with wanton air,
Rolls her dark eye, and waves her golden hair."

You will appreciate the suitableness of these lines when you know more about the plant.

L. Why are flowers so very handsome and yet no one thinks much of pulling them to pieces. We are not nigh as beautiful, though I am sure, much more valuable.

E. That question has puzzled many a-one, and yet is easily explainable. In plants, the most curious parts of their structure are laid open to view, but the similar organs in ourselves entirely concealed. I have no doubt, were it possible to render your hand transparent so that you might see the wondrous animated machinery and gorgeous colors displayed there, the spectacle would far surpass in beauty and finish that exhibited by the rarest production of the vegetable kingdom.

L. You have explained the uses of the stamens and pistils; the corolla, I suppose, has no particular virtue—it is only for ornament.

E. It is the opinion of many that it prepares a fluid for the nourishment of the stamens, and this opinion is rather strengthened by the observation in some flowers of the nectary being only a part of it, as in the common Columbine of the gardens: the little horns of that flower—which some have compared to doves stooping to drink, from whence arose its name of Columbine, from *Columba*, a dove—are nectaries.

L. What is the use of the Nectary?

E. Always for the secretion of honey, and some say this honey is merely for the purpose of tempting insects to come to the plants. There are not a few instances in which the male flowers grow on one plant and the female flowers on another: as the pollen must be shaken on the pistil to ensure fruit, the wind and insects are relied upon for doing this, so that you can perceive the advantage which ensues from companies of insects while gathering honey on the male plant, becoming covered with pollen, visiting directly afterwards the female for the same purpose, and leaving with the last the dust that had adhered to them from the first. The Date has its male and female flowers on separate trees, but the people, not daring to trust to uncertainties, regularly when the pollen becomes ripe, sprinkle it over the female flowers, and thus secure to themselves a valuable, and often indispensable crop of fruit. The nectary in many cases, however, is a separate organ not directly connected with the corolla.

L. What object does the calyx serve.

E. To guard the outer part of the flower, keeping its blossoms in the right place and shielding it from injury. The corolla, whether connected with the secretion of honey or not, serves as a protection to the stamens, folding up regularly at night, to protect them from the influences of the weather.

L. But some, like the bluebells, cannot fold up.

E. There is no need for them to do so, their protection is equally efficacious, as covering them in the manner they do, they serve the purposes of a bell glass, screening them from injurious influences, as the glass does the fancy clock in the parlor.

L. I should think if the corolla folded up to shelter the stamens at night it would do the same in stormy weather, they need it as much then as at any other time, perhaps more.

E. You are right, it should fold up at such times, and it accordingly does do this. From the circumstance of its closing before a storm, and thus foretelling the approach of one, they are often used as weather prophets. That little flower below us is the Scarlet Pimpernel, better known to you, perhaps, as the Weather-Glass; when it does not open in the morning the people stay at home and prepare for rain, and they do this if there is not at the time a cloud in the sky and the sun shining brightly. In France the peasants train to the sides of their cottages a species of Carlina, whose open flowers encourage them to proceed to their daily labor, but when closed form a sure presage of approaching rain.

L. I have heard Uncle John tell a story of a shepherd boy meeting a gentleman with his dogs and gun, going out a hunting, and warning him to return home; but as there were no signs of rain, the gentleman thought he was foolish, and laughed at him. Before noon, however, it rained in torrents, and the gentleman was forced to return; on his way he met his friendly adviser, whom he had treated so rudely, and his curiosity being much excited to find the means the boy possessed of foretelling rain, he offered him a guinea for the information. The boy took the guinea and told him he had noticed that the Shepherd's Weather Glass was not open as he passed it in the morning.

E. Not only do many flowers seem possessed of an instinct to close on the approach of danger, but there is an equal, if not greater power exhibited in their not opening until the proper time, when the most benefit will be derived from the heat and light. Likely the object is to give the pollen the best chances for ripening. You must have observed the singular opening of the Four O'Clock, about the hour its name denotes every afternoon?

L. O, yes, I shall not soon forget taking Maria round the garden to see them, and we could not find any, though I was certain they had been there the day before. It was not until some time afterwards I found that the cause of our not finding them was because we had made too early a visit, and they, like fashionable people, could not be seen so soon.

E. Grainger, in his poem on the sugar cane, recommends the planters to permit their slaves to retire to their huts on the opening of these flowers as a shelter from the heat. The greater number of flowers have such a regular time for opening and shutting, that Linneus gave a list of a number with the idea that it should answer the purpose of a watch, so that by watching the particular time at which a flower opened or shut we could name the exact hour and minute. Mrs. Hemans wrote some lines on this far-famed Dial of Flora, which I wish you would read from her book.

L. 'Twas a lovely thought to mark the hours
As they floated in light away,
By the opening and the folding flowers
That laugh to the summer day.

Thus had each moment its own rich hue,
And its graceful cup and bell,
In whose colored vase might sleep the dew,
Like a pearl in an ocean shell.

To such sweet signs, might the time have flown
In a golden current on,
Ere from the garden, man's first abode,
The glorious guests were gone.

So might the days have been brightly told,
Those days of song and dreams,
When shepherds gathered their flocks of old
By the blue Arcadian streams.

So in those isles of delight that rest
Far off in a breezeless main,
Which many a bark with a weary guest,
Has sought, but still in vain.

Yet is not life in its real flight,
Marked thus, even thus on earth,
By the closing of one hope's delight
And another's gentle birth?

Oh let us live, so that flower by flower,
Shutting in turn may leave,
A lingerer still for the sunset hour,
A charm for the shaded eve.

SECOND CONVERSATION.

L. How is it sister, that at the end of our garden, next the rosebushes, there are some Stramonium plants growing, and a little further on some turnips. I have been looking at the ground and it appears to me all of the same kind; so I cannot see how roses, and poisons, and turnips, can be made of exactly the same thing.

E. Our food at table is generally alike, is it not Laura?

L. Yes, almost always.

E. Why then do not your features and form resemble mine, as exactly as you would have the plants simulate one another?

L. Our souls make us look as we do—plants have no souls.

E. That would not answer my question. It is not your soul that digests your food or makes your heart beat, for in that case these actions could not take place while you slept. You have within you a principle, separate from the soul, called the Vital Power, whose office it is to take charge of the building up and repairing of your body. A plant has exactly the same kind of principle, without a soul. It must be in some measure immaterial, and we can only recognize its existence by its effects.

L. But I do not comprehend how you can tell about that which you cannot see.

E. Here is my watch; can you tell what makes it go?

L. Yes; the mainspring. I perceive what you mean: that when I am witnessing a set of actions I should think there must be some cause sufficient to produce these actions, even though that cause is hidden.

E. You understand me perfectly. There are two kinds of powers in nature, the Life Powers and the Mechanical forces, and these are in perpetual opposition. A good example of this is shown in the case of two seeds, one of which has had an electric spark passed through it in order to destroy its powers. Place both in a warm moist place, and watch the effects. The dead seed soon rots and disappears, while the very warmth and moisture that caused it to decompose excites the living one to grow. A violent contest is evident, the effect of which is seen by the sprouting of a plant that hangs out its flowery banners in token of victory. The Mechanical Forces, from destroying every thing to which they have access, are called the Pullers-down of nature, while their opponents have been styled the Builders-up. Besides, the knowledge received from observation, we have another and an unerring source of information on this subject. The Bible mentions the express creation of a set of vegetable powers distinct from matter and the Mechanical Forces. Will you read the account from Gen. ii. v. 5?

L. And the Lord God made every plant of the field before it was in the earth, and every herb of the field before it grew. Plants then were made before animals.

E. Yes, plants are necessary to the existence of animals, their leaves are required to purify the air.

L. I thought storms did that?

E. They render assistance in another way, but not at all in this of which we are speaking. If I place this large bellglass or receiver over the lamp, how long will it continue burning?

L. A very little time. You have told me before that two kinds of gases, oxygen and nitrogen, form the atmosphere. Oxygen is the true supporter of combustion, and the nitrogen is mixed with it to weaken it, otherwise every thing would burn up too fast. After a little while the flame would consume all the oxygen inside the receiver, and then, as it could not burn without more of it, go out.

E. Suppose there was some contrivance inside the receiver by which oxygen gas was thrown out in sufficient quanties to supply the combustion, when would the flame cease?

L. Not until both the oil and wick were burned up.

E. All animals, including man, resemble lamps in requiring oxygen to keep them burning or alive. But here the resemblance ceases, for the lamp merely consumes the oxygen, but animals, in return for this gas, throw out carbonic acid, a compound, you know, of charcoal and oxygen; this is to them a deadly poison, being of the same kind as the gas found at the bottom of wells and cisterns, and which so often kills those who incautiously descend into them; its mere accumulation in the atmosphere would be sufficient to destroy animal life. To allow us to breathe then, two objects must be attended to; in the first place, a supply of oxygen to take the place of that which is consumed, and, in the second, a means of getting rid of the carbonic acid which would soon kill us if allowed to remain. Both these objects are answered by the leaves of plants which decompose the carbonic acid the moment it touches them. The carbon it retains in its own substance, and sends back the oxygen for the use of animals. You can see from this how dependent we are on even the minutest spire of grass or leaf of a moss, and what necessity there was to make the vegetable world a little before the animal. Saadi, the Persion poet, has a beautiful fable on this subject, in which it has been aptly said of him, that he proved as a philosopher the harmony in nature which he sung as a poet. Will you read it from this?

L. A nightingale is imprisoned in a cage of glass with a rosebush blooming with flowers. Each owes its life to the other. Deprived of fresh air, the bird would soon cease to swell its little throat with harmony. The rose eagerly absorbs the air which has been respired by its loved philomel, and drawing nourishment from it, blushes brighter tints, retaining the carbon, and throwing back the oxygen to be inhaled anew by the bird of song. As often as the nightingale loads the air with effluvia pernicious to itself, the rose neutralizes the poison in its own bosom, and returns pure air to its fellow prisoner. When the bird at length expires of old age, singing its dirge of gratitude, the rosebush withers and dies.

E. This fable presents the subject in its true light, by showing you that while the plant is really necessary to our existence, it is, in working for us, only subserving its own purposes. The four principal elements of vegetables, are CARBON, OXYGEN, HYDROGEN, and NITROGEN. Water is made of the second and third of these, and the atmosphere of the second and fourth. We have seen from what source the Carbon may be derived, so that the facility with which plants can find means of sustenance need excite no surprise; nor yet that they can live without touching the ground and exist on air and the moisture contained in it. Have you ever seen plants that did this, Laura?

L. O yes. There are Orchis plants in the hot-house, that look just like butterflies, both in shape and color, which the gardener says live on nothing but air, and that he has not even to water them.

E. The food taken into the stomach after eating, is digested, and then goes through a variety of processes, which terminates by passing it through the lungs, at which place carbonic acid is thrown out and oxygen received. Plants take their food by means of little bundles of leech-like mouths fixed at the end of their roots, termed spongioles; these suck from the soil whatever is necessary to the support of the plant, and then act the part of stomachs by immediately digesting it. A set of vessels carries it up to the leaves to be further elaborated, while there, a supply of carbon, a substance which makes most of the body of the plant, is received, and a corresponding amount of oxygen thrown off, and the sap, thus purified, goes the rounds of the system in another set of vessels, to supply its necessities and form its compounds.

L. Then the odors of Rose and Lemon, and Cinnamon, are made of nothing but air and water.

E. The elements of their composition are mostly derived from the substances you have named. In the human system are a set of bodies called glands, whose office it is to make up or combine the various secretions required in the body. When the blood comes to these glands they take from it whatever they want, and then manufacture from those materials the substances required. It is in this way the liver makes bile, and the lachrymal gland tears. Plants have a similar set of little organs, or glands, that from the pure juice make up the essential oils, as Rose, Cinnamon, Lavender, and Lemon; the different salts, as Oxalic Acid, Quinine, and Salacine; and noxious compounds, as the Upas juice, and Prussic Acid. Odors, poisons, and medicines, are all made in this way, by the life power, from the simplest elements.

L. But we could not take those elements and make them?

E. Certainly not. It could only be accomplished by the agency of the life-power working in its accustomed manner. Some years since when it became generally known of what elements milk was composed, the chemists of Paris undertook to supply that city with pure milk of their own manufacture, but as they could not govern the vital powers, their influence being limited to the forces of mechanics and chemistry, the attempt signally failed. To-morrow, we will commence studying the classification of plants, to which most of the matter we have gone over, has been but preliminary.

THIRD CONVERSATION.

E. Well, Laura, I perceive you are ready to commence the study of classification. You understand enough of the elementary organs to proceed without further trouble. But before we commence will you find out the meaning of the word Botany?

L. It is said to be derived from a Greek word signifying the history of the vegetable kingdom. Its object is to examine the different parts or organs of plants, and explain their functions: and to compare one with another so as to make a basis of discrimination.

E. There are 100,000 different species of plants known at the present time, and this number is constantly increasing by new discoveries.

L. What is a species?

E. Linneus thought, what was undoubtedly the case, that there were as many species as different forms of vegetables produced at the creation. It is in the knowledge of the greatest number of species, the best botanist is shown. A species is a family agreeing with each other in every particular, except in some instances where cultivation produces what are called varieties. Thus, all the yellow roses form one species, the damask roses another, the French roses a third, and so on through a great number.

L. But is there not some mode of grouping the roses under one head which will distinguish them from pinks, and lilacs, and other flowers, as the species show a difference between themselves?

E. Yes. A number of species form a genus. All flowers with a pitcher-shaped calyx, which is fleshy, contracted at the base, and divided into five parts that adhere to each other—the corollas of which have fine petals, and inside many hairy seeds affixed to the calyx—belong to the rose genus. A genus may be compared to an ordinary family, all of whom bear the same surname, though each person is distinguished by a particular specific name. The genus is constituted by the presence, or absence, the number, figure, proportion, and situation of the several parts: in fixing on these it was, of course, necessary to select such as are constant in both genus and species. The roots, trunk, and branches, may all furnish specific differences, while the nectary and other important organs, are selected for the generic.

L. In how many genera are these 100,000 species divided?

E. There are now over 6000 genera described.

L. Is there any still higher mode of classification by which the genera are combined together?

E. Yes; into orders, and these again combine to form classes. Can you repeat the names of the different divisions?

L. Species, Genera, Orders, and Classes.

E. That is right. It is now my intention to take each class separately, mention how its orders are formed, and notice some of the flowers belonging to it. I will, before commencing, give you a general idea of the Linnean System of Classification. The first ten classes are known by the number of single stamens in a flower, for instance, if there is one stamen it is in the first class; two stamens place it in the second class, and so with the others, until you arrive at ten. What class was the Pink in we analysed?

L. The tenth class. How very easy such a system is.

E. It has been much celebrated for its extreme simplicity. You remember the meaning of the Greek word Andria? to this is added the Greek terms of the numbers, one, two, and three, up to ten, thus:

1 MON-ANDRIA, one husband.
2 DI-ANDRIA, two husbands.
3 TRI-ANDRIA, three husbands.
4 TETR-ANDRIA, four husbands.
5 PENT-ANDRIA, five husbands.
6 HEX-ANDRIA, six husbands.
7 HEPT-ANDRIA, seven husbands.
8 OCT-ANDRIA, eight husbands.
9 ENNE-ANDRIA, nine husbands.
10 DEC-ANDRIA, ten husbands.

Many of these prefixes are used in ordinary language, as monarchy, dialogue, tripod, tetragon, pentagon, hexagon, heptarchy, octagon, and decimate.

L. I can remember the names of the first ten without difficulty: but they are so easy I am afraid something more difficult is coming.

E. Not so; you have already mastered the hardest part. The remaining classes are:

11 Dodec-Andria, from 11 to 20 husbands.

12 Icos-Andria, 20 or more husbands affixed to the calyx.

13 Poly-Andria, many husbands affixed to the receptacle.

14 Didynamia, four husbands—2 stronger than the rest.

15 Tetradynamia, six husbands—4 stronger than the rest.

16 Monadelphia, one brotherhood—husbands joined in one set.

17 Diadelphia, two brotherhoods—husbands joined in two sets.

18 Polyadelphia, many brotherhoods—husbands joined in more than two sets.

19 Syngenesia, many flowers in one—anthers united.

20 Gyn-Andria, husband growing from the wife.

21 Monœcia, husbands and wives in different rooms of the same house.

22 Diœcia, husbands and wives in separate houses.

23 Polygamia, mixture of the two preceeding, with perfect flowers.

24 Cyptogamia, flowerless plants.

I will explain them more minutely as we proceed.

L. In what manner are the ORDERS found out?

E. Those in the first thirteen classes depend on the number of pistils, or rather stigmas, as the styles are often wanting, and the stigma rests upon the germ. As the pink is included in this number, will you tell what order it is in?

L. The pink has two pistils and is consequently in the second order of the tenth class. Do they prefix the Greek numbers to them as naming the classes?

E. Yes. The first order is MONOGYNIA, the second DIGYNIA, and so with the others. There are two orders in the 14th class; but we had better defer mention of them until we come to the classes themselves. In what class and order, Laura, is the Lily that is in this vase?

L. The sixth class and first order, from the six stamens and one pistil. How very simple the system of Linneus is!

E. You must remember it is not a perfect system, by any means, and at the present day used but as an introduction to a far more perfect one, the Natural System, in contrast with which, that of Linneus' is called Artificial. But to commence; here is a collection of songs of the different classes modified. The different subjects of Flora, or the Queen of Flowers, are supposed to be called up to recite their different gathering songs, all of which I wish you to commit to memory. And now, what is the first class?

L. Monandria, composed of plants having but one stamen.

E. You can see all the different ranks represented in the first plate in the order of their classification. A glance at it will teach you more than I can tell you in a long time. The few plants Monandria contains, generally belong to the warmest climates, as the Ginger and Cardamon. The Canna is the name of a genus of flowering reeds, found native in the United States; some of the species of this genus found in the southern continent, are eminently beautiful. The flowers which are collected in clusters expand gradually, and are noted for their curious appearance. The Arrowroot—Maranta, and Marestail—Hippuris, belong also to this class. The Salicornia or Glasswort, is a plant commonly found in England, on the muddy shores of the sea, overflowed by the tide. The name is one of the descriptive words of Linneus, by which he so well knew how to distinguish the plants he named. It is derived from *sal* salt, and *cornu* a horn, from the horn-like branches and saline nature of the plant. The species are very useful by yielding a great quantity of soda for the manufacture of glass and soap. Now Laura, your song.

L. SONG OF THE MON-ANDRIAN TRIBES.

Flower of the ocean though Nature refuse
Bright tints to thy blossom or fragrant dews,
Salicornia we name thee our chieftain's pride,
And honor thee still for virtues tried.

Frequenter of waters, thy curious form,
Hippuris is floating in sunshine and storm,
Our chieftain's crest is the Canna flower
With Maranta useful in sickness' dark hour.

E. The next class is Diandria or two stamens. It contains a more numerous collection of flowers than the first. The beautiful Speedwell—VERONICA, giving us all the different shades of blue, and adorning neglected places, road-sides, and ditches, early in the spring and late in the autumn; the blossoms of this genus have a remarkable tendency to fly off in wet weather. The Lilac—Syringa, with its inimitably delicate blossoms and fresh odor. The Privet—Ligustrum, with its white blossoms forming such an elegant ornament to the fences, and generally found in company with the Lilac. The useful, and in some of its species, resplendent Sage—Salvia, its different leaves varying from a hoary wrinkled appearance and oval shape, and very odorous, to the resemblance of a lyre, and without scent. Nuttall, informs us that in Florida, is a species with scarlet flowers, and in South Carolina, one in which they are a bright azure blue. The most splendid and easily cultivated of all being brought from Brazil, which is covered in the fall with brilliant flowers, even the calyx and stalk being of the same color. The sweet Vernal-Grass, said to be fragrant as a Tonca bean,will finish our list.

L. SONG OF THE DI-ADRIAN TRIBES.

The *Speedwell* flowers from hill and dale,
The *Salvia* bright, and the Privet pale,
With *Fragrant Grass* we bear in hand
For the lad who leads our gallant band.

Fair flowers should deck fair lady's head,
And balmy sweets in her pathway be spread.
O noble lady, refuse not thou,
The wreath of *Syringa* we place on thy brow.

E. We come now to Triandria, or three stamens. It is here we find the great tribes of Grain, Reeds, Grasses, and Sugar Canes. The Indian Corn does not belong here with the rest, the reason of which you will find as we proceed. Wheat has been aptly made the emblem of riches, for, with the use of fire, it seems to have been confided to the care of man to secure him the sceptre of the earth. The grains most useful to man, perish when they have matured their seed and provided for his sustenance that year: and without a fresh and over-called-for renewal of his exertions, he would inevitably be without them and starve, for none of the plants that furnish them can now be found in a primitive or wild state. There are times when food is considered much more valuable than all the riches in the world. Will you read this anecdote which very prettily proves my position?

L. An Arab wandering in the desert, had not tasted food for the space of two days, and began to be apprehensive of famine. In passing near a well where the caravans stopped, he perceived a little leather sack on the sand; he took it up saying, "God be praised, it is, I think, a little flour." He hastened to open the sack, but at the sight of its contents, he cried, "How unfortunate I am! it is only gold powder."

E. Without the plants of this class, the landscape would be destitute of beauty: their absence invariably denotes solitude and sterility. It also contains many splendid and valuable flowers, some of which are noticed in the gathering song with which we will close.

L. SONG OF THE TRI-ANDRIAN TRIBES.

The *Crocus* is ours with its petals of gold,
For us does the *Iris* her banners unfold.
We clothe the green hill and the verdant dell,
And the shepherd loves in our land to dwell.
His flock in our boundless pasture he feeds,
And his cattle graze in our countless meeds.
Princess, our homage to thee we yield,
And hail thee as Queen of the forest and field.

FOURTH CONVERSATION.

E. Our next class is Tetrandria, or four stamens. It contains many natural assemblages of plants, some of which are noted for usefulness, some for curious properties, and some for beauty. A far-famed plant in this class, is the Holly—Ilex, an ornamental timber tree.

An author speaking of the Holly, says that the economy of trees, plants, and vegetables, is a curious subject of inquiry, and in all of them we may trace the hand of a beneficent Creator. The same care that he has bestowed on his creatures, he has extended to hollies: the edges of the leaves are provided with strong sharp spines as high up as they are within the reach of cattle; above that height the leaves are smooth, the protecting spines being no longer necessary.

L. I remember reading some poetry on the Holly, by Southey the English poet: shall I get the book and read it to you?

E. If you please, Laura.

L. Oh reader! hast thou ever stood to see
The Holly tree,
The eye that contemplates it will perceive
Its glossy leaves;
Ordered by an intelligence so wise,
As might confound the Atheist's sophistries.

Below a circling fence its leaves are seen
Wrinkled and keen;
No grazing cattle through their prickly round
Can reach to wound;
But as they grow where nothing is to fear,
Smooth and unarmed the pointless leaves appear.

E. The Dogwood Genus—Cornus, most beautifully ornaments our woods in May and June. They are of all sizes, from a few inches to the height of small trees and shrubs. Willis speaks of toting loads of dogwood blossoms. There is a remarkable plant in this class which you may remember my pointing out to you last March near the wood, it was almost covered with snow and looked somewhat like you said, a huge frog half buried. It was the Skunk Cabbage—Symplocarpus, called such from its disagreeable odor exactly resembling that of the animal from which it is named. The Witch Hazel, is another curious plant found here, noted for its flowering late in the fall, when its leaves are falling off, the yellow fringe-like blossoms being devel oped on naked branches. The Teasel—Dipsa cus, is cultivated for dressing cloth to which it gives a finishing nap ; one of the species is known as the Shepherd's Staff. With the yellow flowers of the Ladies Bed Straw—Galium, you are acquainted, as well as the Ladies Mantle—Alchemilla, with which we will dismiss the Tetrandrian Class after hearing your song.

L. SONG OF THE TETRANDIAN TRIBES.

Thou to whom our vows belong,
Princess, listen to our song?
A golden couch we spread for thee,
With clustering heaps of *Galium* flowers,
The *Shepherd's Staff* shall be our spear
To guard thee in thy noontide bowers.

Our *Ladies' Mantle*, while we sing,
To deck thy couch we humbly bring;
And woodland *Cornel's* flowery boughs,
We bind around thy snowy brow,
Thou to whom our vows belong,
Princess! listen to our song?

E. Our next is Pentandria, or five stamens, which is the most important class by far of the twenty-four, and contains alone one-fifth, at least, of the flowers in the vegetable kingdom. Not only does the number five prevail in the stamens, but most generally in every other part. In the plant that has five stamens you find five petals, five sepals, and a five celled seed vessel. In this class, much more than in the others, the necessity of a natural system is strongly felt, and it is here in fact, the learner becomes acquainted with the leading features of that system.

L. I am afraid I shall become confused by such a mixture of classifications, and would rather go on without learning any thing about it until I understand the system of Linnæus, which we are now studying.

E. On the contrary, it will assist you very much at present, and so far from confusing, render your ideas more clear. One of the natural groups in this class is the ASPERIFOLIA of Linnæus, or rough-leaved plants, so called from *asper* rough, and *folia* a leaf. In this family you can readily distinguish the Borage—Borago, with its bright blue starry flowers. The plant abounds in juice, which is sometimes employed in medicine, and is used in England for making a cooling drink. The Vipers Bugloss- -Echium, so named from the style which looks like the forked tongue of a snake: it is often called Blue Weed from the color of its blossoms. I will close the account of this somewhat astringent family, with the prettiest flower in it, the Forget Me Not—Mysotis, the origin of whose name I heard you reading the other day, do you remember it?

L. O yes! a lady and gentleman were walking by the banks of a river, when the lady admired the flower at some distance in the stream. The gentleman plunged in the water to obtain it for her, and got it, but his strength could not carry him to the bank against the current of the river, and he had just time to throw it on the shore and cry out, Forget Me Not, before he sunk and was drowned. The flower has always borne the name of Forget Me Not since.

E. Another family of this class, is that of the Bindweed—Convolvulus, which takes its name from a word meaning to entwine, as their slender stems twine around other plants to enable them to support themselves. They are all known by their bell-shaped, plaited corollas which are handsomely colored of different hues. The Morning Glory is one of them, the Solanum–Potato family is another, which includes the Stramonium, Ground Cherry, Henbane, Tobacco, and many others.

L. The potato family does not surely include poisonous plants?

E. It is itself poisonous. The tubers of the potato plant which we eat, are merely reservois of nourishment that it lays by for itself, and the mealy matter of which, serves as food for us as it would do for the plant if left alone. Whatever poisonous matter is found in the tubers is dissipated by the operations of cookery.

L. Is there any other poisonous plant that can be used the same way?

E. Yes, a number of them. In South America the tuberous roots of one of the Hemlock—Conium family, are eaten like the potato, and esteemed quite as good.

L. Is it true that there are some poisonous plants which, when young, can be eaten without danger as table greens?

E. It is; but they must be well boiled first Climate, as well as age, in a great measure, modifies the poisonous properties of plants. The Aconite, so poisonous with us, is eaten in Sweden as a salad to create appetite. But to return, in the fifth class are the Honeysuckle tribe—Caprifolium, the Umbrella-like plants—Umbellifera, as the Carrot, Coriander, Dill, and Anis Seed, and, to conclude, the enumeration of the few I wish to bring before your mind, the Silk Weeds and Violets. Your song, Laura.

L. SONG OF THE PENTANDRIAN.

Oh talk not of Araby's spice scented gales,
Come wander awhile in our own fertile vales;
Sweet blossoms are springing wherever we tread,
And the woodline is hanging its wreaths overhead.

Its graceful boughs by the night winds are bent,
And how sweetly they give out their fragrant scent!
Say, canst thou envy Arabia now,
Or ask for her garlands to twine round thy brow?

Oh talk not of India's rose hung bowers,
And the hues of rainbow-tinted flowers;
Look thou on our rich and varied store,
And envy the gardens of Gul no more.

E. We now come to Hexandria or six stamens, which Nuttall styles a very natural, though varied assemblage of plants. With a few exceptions the plants in it belong to the great Mono-cotyledonous class of the natural system.

L. What does Mono-cotyledonous mean?

E. Mono, you are aware, is the Greek term for the number one; Cotyledon is a word derived from the same language, meaning cavity; its exact synonym is therefore one cavity. When you break an egg you will notice the yolk; this would, if allowed to be hatched, form no part of the future chicken, whose form begins in the white; the yolk remains in its body to serve as a means of nourishment until it is able to provide food for itself. Nature expends no less care on seeds, which are in truth vegetable eggs. Besides the embryo of the future plant contained in the seed, is a supply of nutritious matter stored in the cavity of a leaf to supply its immediate wants while germinating; hence the leaf is called a Cotyledon or seed leaf. The object in placing it in a leaf, is for this leaf to sprout up and purify or prepare the root for the young embryo. When but one leaf is observed, the plant which is springing into being is considered as belonging to the Mono-Cotyledonous class; if there are two leaves, to the Di-Cotyledonous class, and if more than two, to the Poly-Cotyledonous class.

L. But if there are none, how are plants without Cotyledons named?

E. A—Cotyledonous, meaning literally as you observed, without Cotyledons. One of the Hexandrian class, the Lily, has already been mentioned; of that genus the United States affords several splendid species; rivalling the Lily in beauty, and, in the opinion of many, far more stately and gorgeous, comes the Tulip, which some time since so fearfully turned the heads of the Dutch florists, that particular Tulips are known to have been exchanged for farms, horses and carriages, ships, and even large estates. The Spiderwort—Tradescanti, so common in our gardens, with its beautiful blue flow ers, is also here with the Calamus and Hyacycinth. The white bells of the Solomon's Seal—Convallaria, the edges of which seem to be tinged with the green of the leaves under which they are found peeping, and its elegant sister, the Lily of the Valley, so renowned in song as the emblem of purity, are also in the sixth class, and then we have the Narcissus, whose history I suppose you remember.

L. He was a youth who looked at himself in a river, and was so delighted with his own beautiful image as to fall in love with it. He pined away inconsolably, and died of grief at last. When his friends came to bury him they only found a rising stalk with yellow blossoms crowned, which ever after bears his name of Narcissus.

E. I will close my enumeration by mentioning the Bethlehem Star—Ornithogalum, which, like the Lily, has been made the emblem of purity, and whose beautiful star-like blossoms, so sweet, pure, and agreeable, merit the distinction of its name. Its flowers are white as the drifted snow.

L. SONG OF THE HEXANDRIAN TRIBES.

Fair blossoms o'er thy path we fling,
Narcissus, peerless flower of spring,
And the *Vale Lily*, lo, we bring,
O Gallant Chief!

With *Calamus* we strew the bower;
But *Bethlehem's Star* shall be the flower
To guide us through the darkest hour,
O Gallant Chief!

With mystic rites we break the stem,
Now let its bright and silvery gem
Enrich thy silver diadem,
O Gallant Chief!

E. The Class Heptandria, or seven stamens, is comparatively a small one, and the plants in it afford rather imperfect specimens of the class. The Horse Chesnut—Æsculus, is here, which comes to us from Mount Pindus in Asia. Its common name was derived from a custom of the Turks, who ground the nuts of the tree and mixed them with corn for their horses. It gives the deepest and most solemn shade of any tree which is known; when in full blossom, such are the elegance and beauty of its flowers, that their contrast with the splendid green leaves has caused the comparison of a mountain of ivory and emeralds. The only other plant in the class with which you can at all expect to become acquainted, is the Chickweed Wintergreen—Trientalis, a flower common both to Europe and America. Our species has longer and narrower leaves than the European. It may be found in May or June, the time when it is in flower, in shady woods near the base of trees. In Europe, its favorite home is in the Highlands of Scotland, where it grows abundantly, and is considered by botanists as one of the most interesting vegetable productions of the district. It is described by them as a delicate little plant with bright green leaves, a slender stem, and white star-like flowers. The brilliant white flowers become tinged with pink as it fades, and its black seeds are embossed in a covering which resembles the finest white lace, called a reticulated tunic. Linneus distinguished this as his favorite little plant. We will leave the class after your song.

L. SONG OF THE HEPTANDRIAN TRIBES.

Lady we bring thee our simple flower:
We have sought it in vain in the rose hung bower;
On the sunny bank where the violet blows;
O'er the wide open downs where the wild thyme grows;
It was not there; it was not here;

Then we followed the tracks of the mountain deer,
And turned with untiring zeal to explore
The tangled wood and the Highland moor.
And there the hermit flower was seen,
The lone and lowly *Wintergreen*,
  Chief of tribes but few, to thee
  We bring our prize on bended knee.

FIFTH CONVERSATION.

E. The chieftain of the Class Octandria, should wear a forester's dress, as it is to the woods that most of its tribes belong. The Sycamore is among them, waving its tall branches close to the sea-side, and but little affected it is supposed, by the tall spray. There are great numbers of this stately tree on the east end of Long Island; but at present for some unknown cause, though they formerly flourished well, are decaying, and present a blighted appearance. The name, which means a wild fig, was improperly given, as it resembles the fig but very little, not even as much as its brother, the Maple, which tree with us attains a height of fifty feet; its wood is useful in making cups and bowls, but its principal value consists in the sweet sap it possesses in such abundance, from which Maple sugar is made. In this class are the heaths, with which the poor of Scotland make their beds; the Merzereon, whose honeyed flowers are among the first to regale the bees in spring; and the Rosebay Willow-herb, an exceedingly gay flowering shrub. There are many berries too, pleasant both to sight and taste, the Bilberry, and Cranberry. The Tree Primrose, a genus peculiar to our continent, of which, in the United States, are many splendid and curious species: the flowers are all either yellow or white, and open only in the evening after sun-set. The Fuchsia—Ladies Ear-drops, belongs here, as does the Herb Paris, often called in England, True Love, or one berry, from its single green blossom and black berry growing in the centre of four verdant leaves. But I have said enough to give you a concise idea of the class, and will hear your song.

L. SONG OF THE OCTANDRIAN TRIBES.

Like bold Robin Hood and his merry men,
In the good green wood 'tis our joy to roam,
We deepen the shade of the forest glen,
And our branches we wave round the peasant's home.

A feast of sweet berries to cheer him we spread,
  When he comes in our sylvan shade to recline;
The *Heather* we give for his rustic bed,
  And the *Maple* bowl for his honeyed vine.

We enrich the young shepherds who fly to our bower,
  With many a prize for their favorite maids,
And we crown our gifts with the *True Love* flower,
  Which unfolds its green leaves in our forest glades.

E. The Class Enneandria, or nine stamens, contains your favorite, the Rhubarb; also the Sassafras, Camphor, and Cinnamon trees. The Alligator pear of the West Indies, belongs here. It is a very large fruit, with a taste like butter, and very much esteemed. The Butomus, or flowering rush, is in the ninth class. In England this superb flower is so much admired as to be called the pride of the Thames, its rich clusters of rose colored blossoms covering the tall stem, present a beautiful appearance in the midst of the waters.

L. SONG OF THE ENNEANDRIAN TRIBES.

Chieftain for thee on the slender spear,
The crown of *Butomus* flowers we bear.
By the sedgy streams of the deep green vale,
We dwell with the summer nightingale.

She flies from India's sultry groves,
To tell us sweet tales of her Eastern loves,
When the latest notes of the liquid song,
Are floating the woodland valleys among.

The buds of the roseate flowers expand
As if waked to life by the music bland;
Princess receive from the nymphs of the spring,
The Butomus blossoms thy votaries bring.

L. When speaking of the Class Pentandria, I noticed the fact that almost all the flowers had not only five stamens, but five petals and five sepals; I might have said that where the number varied it would be most probably a multiple of five, as ten or fifteen. The same rule prevails in other classes, where you have three stamens, there will be generally three, six, or nine petals and sepals. As might be expected from this, the different classes that are multiples of each other have considerably affinity. And it is so between this class—Decandria, or ten stamens, and the fifth class. The American Senna—Cassia, is here, a valuable medicinal plant; though a larger dose is required of it to produce the same effect than the Senna of the shops, yet it is rapidly superceding the imported, and we will soon, probably, use it altogether instead, as physicians of the present time show a disposition to rely as far as possible on the resources of their own country. The Pinks, you know, are in this class, as are the Wintergreen, Pipsisseway, and Silene. The Poke is found flourishing wherever the soil is good.

L. Yes I know it very well; we often use the berries at school instead of ink.

E. It is one of those plants, which, though poisonous when old, can in its young state, be boiled and eaten without danger as greens. The berries are put in alcohol to make a tincture which is used in curing rheumatism. The flowers of the Arbutus add greatly to the beauty of the class. It grows wild in the south of Ireland, where it was introduced a long time since, and is much celebrated by the Irish poets. Among the rest is the Wood Sorrel, which is spoken of as gem of a plant, so beautiful is it in every part; its almost transparent white flowers are marked with minute purple veins, and these, with its delicate light green leaves and its bright rose colored root, fill up the measure of its attractions; from it oxalic acid is made. The Wild Indigo—Baptisia, is a very common plant, covering the waste places of the country with its yellow butterfly-shaped flowers, from July to September. It derives its common name from having formerly been employed as a substitute for Indigo. Have you ever heard of the Venus' Fly Trap?

L. Yes; the plant that has a gum spread over its leaves to tempt flies and other insects, which, when they light on them, close up directly and crush them to death so as to find itself in food.

E. That is in our present class, and with it, and the mention of what is considered by many as the most beautiful tribe of shrubs indigenous to America—the Rhododendrons, I will conclude. The species have flowers of red, white, and pink, very fragrant, and of different sizes. Some are evergreens, and others have the leaves fall off in the usual season.

L. SONG OF THE DECANDRIAN TRIBES.

Spread the light sail, that our chieftain may rove
Again in the shade of the *Arbutus* grove,
That decks the green isles in Killarney's lake,
And hangs its red fruit 'mid the tangled brake.

Oh: Arbutus tree,
We pluck from thee,
That spray that forms our chieftain's crest,
With thy berries bright
As the rosy light;
The sun gives out when he sinks in the west.

Through enchanted groves,
Where the poet roves,
In Araby's fair and sunny clime,
He sees not a gem
On its golden stem,
More lovely than this in its season of prime.

E. We have now come to the class Dodecandria, or from 11 to 20 stamens, a very variable class indeed, so much so that many botanists have abolished it and distributed the flowers in other classes. The literal rendering of the name is twelve stamens. Agrimony is one of its genera; it is somewhat noted as a medical plant, bearing yellow flowers in June and July, which are liked by many for their fragrance. The Reseda is the most important genus in the class; among its species are the Mignonette or little darling, which though not remarkable for either beauty or scent, is yet universally beloved—and the Dyer's Weed, a plant of great use in dying as it imparts a beautiful yellow color to cotton, woolen, silk, and linen; it is besides, the foundation of green dye, which it is well known is not a primitive color, but composed of yellow and blue. As I touched on this class merely to give you the true classification of Linneus, your song will dismiss it.

L. SONG OF THE DODECANDRIAN TRIBES.

In desert spots and chalky dells,
The pale *Reseda* meekly dwells,
Yet hid within her petals lie,
Tints that with Ophir's gold may vie;
The princely banner proudly spread
Above the courts where monarchs tread,
  Gleaming with many a glorious hue,
  From this pale flower its splendor drew.

Let none behold with cold disdain,
The simplest blossom of the plain!
Let none the simplest being scorn,
Though humbly placed and meanly born;
The lowliest thing may have the power
To cheer and bless the loftiest bower.
  Queen of the Flowers, thee we greet,
  And lay our tribute at thy feet.

E. In the Class Icosandria, or twenty stamens, as its Greek name would signify, the number ranges from seven to one thousand, and of course in such a case can be of little consequence. You must remember that in this and the next class the important point for consideration is on what part of the flower they are inserted. *Inconstancy*, of the number and the point of *insertion*, are the really valid characters of the class. The number generally averages about twenty, and the stamens are inserted upon the sides of the calyx.

L. I should think then it would have been much better named by a word compounded of calyx and andria, as that would tell its real meaning.

E. Such a word has actually been suggested, and in more than one instance employed by eminent botanists. In this class the tube Cactus is generally first mentioned; they are noted for their misshapen trunks, want of leaves, and gorgeous flowers, which shine more brilliantly by the unexpectedness as it were, of the display in contrast, to the stems from which they spring. The Prickly Pear, which is found on the Hudson, is one of the species, and the Night Blooming Cereus another. Do you know any thing about the last flower?

L. Yes, I waited up one night to see it open, which it did about nine o'clock in the evening, the flowers were some feet around, of a white color, with a yellow calyx. Some that were with me compared the odor to Vanilla. Before morning they closed and never opened again.

E. In this class are found Plums, Cherries, Peas, Apples, Raspberries, Blackberries, and Strawberries. Almonds, and Peaches, and Pomegranates. The Meadow Sweet—Spirea-

Ulmaria, often called Queen of the Meadows, the regal plumes of which are described as consisting of rich clusters of cream colored hawthorn-scented blossoms. And last though not least, the real Queen of Flowers, the Rose genus in all its glory and magnificence.

L. SONG OF THE ICOSANDRIAN TRIBES.

Pomona! from the Vintage Bowers,
We come with mingled fruits and flowers.
The *Strawberry* from its lowly bed,
We pluck before thy throne to spread;
With the *Service-wild* and the woodland *Plum*,
Lo! thy faithful votaries come.

From the glowing Raspberry's wavering stem,
We gather many a ruby gem;
We rifle the boughs of the Cherry tree,
To find an offering meet for thee;
The sweet *Ulmaria's* fragrant bloom,
We gather to form a regal plume.

And o'er these proffered gifts we throw,
The roses that around us grow;
The matchless *Rose* whose sweet perfume,
Outlives its fair but fleeting bloom,
And breathes around the faded flower,
The odors of its opening hour.

E. Like the class we have just been examining, Polyandria, our present one, has an indefinite number of stamens, varying from eleven to eleven hundred; consequently, number alone, as in Icosandria, could not be a means of distinction; that is given by the *stamens being inserted on*, or *growing from, the receptacle or base of the flower.* By analysing the flower you can at once tell the class without trouble. It contains a great number of flowers, valuable for fragrance and beauty, as well as medicinal properties. The Bloodroot is here one of the earliest spring flowers. The rough winds of the season would soon destroy it were it not for the great mass of leaves that surround it which fall the previous autumn, and in the midst of which, in bright contrast it sends up its lively white flowers. The Poppy—Papaver, is the most important medicinal plant in the class; you know how opium is procured from it?

L. I think I have heard; they cut the plant and collect the sap which flows from it, and then boil it down to the thickness required, and that this dried juice is the opium of the shops.

E. The Clematis—Virgin's Bower, is also here, with its leaves of greenish-white feathery-flowers; the Marsh Marigold with its rich golden cups that open in early spring; and many species of Anemone, among which the Pasque-flower, and Wood Anemone, rank conspicuously. The Peonies Magnolias, and the Tulip Tree, help to form a splendid array. We will finish with the Sweet Scented Water Lily. It has a large, round, bright green leaf, which as well as the flowers, floats on the surface of the water by means of the air contained in their separate stalks, both of which spring from the root. Many efforts have been made to catch the delicious odor in the form of an essense, but all have failed. Dr. Smith observes that these splendid flowers expand in sunshine and in the middle of the day, only closing towards evening, when they recline on the surface of the water or sink beneath it; the berry gradually decays at the bottom of the water scattering its seed in the mud. The stimulus of light acts on the flowers and leaves and causes them to rise and expand so that the pollen may ripen and reach the stigma uninjured. When the stimulus ceases to act they close again, drooping by their own weight to a certain depth; lastly, the more ponderous fruit finally sinks to the bottom.

L. SONG OF THE POLYANDRIAN TRIBES.

Chief of our tribes to thee we bring
Meet offering for a sylvan king,
As thy royal diadem ;
The *Clematis* is wrested for thee,
Enriched with many a ruby gem,
From the glowing *Peony.*

Her gift the assure *Pasque flower* sends
A blossom fit for courtly bowers ;
Her aid the bright *Papaver* lends,
And blends it with her scarlet flowers.

And golden *Caltha* cups we bring,
To pledge thee in the flowing tide,
And *Lillies* from the crystal spring,
And *Larkspur* from the mountain side;
Chief of varied tribes to thee
We bring our gifts on bended knee.

SIXTH CONVERSATION.

E. We have now arrived at the Class Didynamia, so named from two Greek words meaning two powers. The flowers in it contain four stamens, two of which are much longer than the others, and hence the name of the class, arising from the idea of their being more power ful. Botanists consider the inequality of the corolla as having something to do with the inequality of the stamens.

L. I suppose the orders in this class are not taken from the number of pistils as in the first thirteen, or you would not have ceased mentioning them at this place?

E. The orders in this class embrace natural assemblages of plants. There are two orders, the first of which is Gymnospermia or naked seeded, because at the bottom of the calyx of each flower the seeds are seen apparently naked, but have since been proved to possess a thin covering. The next order is Angiospermia, or seeds with a covering.

L. But as both have coverings, I should not think the names of the orders correct?

E. They are not so; but it is a very difficult thing to alter a name once given, the inconvenience it would give rise to, especially in botany, might prove very great indeed. In this class are found most of the labiatæ or lipped flowers, so called from being divided at the top into two parts, very similar to the lips of an animal. Of these there are two kinds, the *ringent* or gaping, and *personate* or closed.

L. Then the Sage should be in this class, its flowers resemble lips.

E. It would be were it not that it had only two perfectly developed stamens; we can trace in it the beginning or rudiments of two more, as if Nature had at first designed it for the class, but afterwards changed her mind, just leaving enough to show her intention. There are other plants in the same situation as the Sage, about the whole of which Linneus remarked that the insects who mostly visited them had but two perfect wings, the rudiments of two more lying useless and concealed under a little membrane. This fact has often been brought forward to show the harmony of nature. But to return to study. What is the first order in this class?

L. Gymnospermia, known by the seed appearing naked.

E. This order includes the *labiate* corollas of the *ringent*, or gaping kind, they most inhabit places exposed to the sun, as hills and vales, and the great majority are aromatic, from which by distillation, the essential oils are obtained. In this order are the Peppermint, Lavender, Marjoram, and Thyme, the last of which is celebrated for giving the remarkably delicious flavor to the honey of Hymettus. The wild Thyme still abounds there, and the bees feast on its blossoms, surviving, as Wordsworth tells us, all the revolutions that have changed the features and uprooted the population of Attica. Though the defile of Thermopylæ has become a swampy plain, and the bed of the Cephisus is laid dry, this one feature of the country has remained unallered :

> " And still his honey'd store Hymettus yields,
> There the blithe bee his fragant fortress builds,
> The free born wanderer of the mountain air."

It has been remarked of the Ringent flowers that they are never poisonous, many of them on the contrary are much used for family medicine, as the Pennyroyal, Catnep, and Horehound.

L. Is it true that Cats are so fond of Catnep.

E. Yes, its odor makes it very attractive to them, so much so that they often tear it up and eat it with much greediness. What is the second order in this class ?

L. Angiospermia or covered seeds, which are also generally contained in a Capsule or little box.

E. In this order are found the *labiate* corollas of the *personate*, or closed kind; neither order is entirely confined to the labiatæ, and in this some are quite open and regular, having bell-shaped and funnel-formed corollas. None of this order is used in cookery; but it affords many valuable medicines, among which the Fox Glove takes the first rank, the common name of which was at first Fairy's Glove, from its thimble-like corollas. A poet says,

> The Fox-glove on fair Flora's hand is worn,
> Lest while she gathers flowers she finds a thorn.

Here is also the magnificent Trumpet Flower, in which the bill of the dear little humming bird is often found buried. The Snap Dragon is another curious flower, as well as the Painted Cup. With the mention of the Verbena, we will pass on to the next class after your song.

L. SONG OF THE DIDYNAMIAN TRIBES.

Come honey bee with thy busy hum,
To our fragrant beds of wild Thyme come,
And enter the Snap Dragon's fragrant bower,
While the Humming bird sips from the Trumpet
flower.

Come honey-bee,
We spread for thee,
A rich repast in wood and field,

And the *Marjoram* flowers
Within our bowers,
To thee their nectared essence yield;
Come honey-bee with thy busy hum,
Our *Mint* like flowers still bid thee come.

E. The next class, Tetradynamia, contains flowers with six stamens, four of which are long and two short, hence arising its name, the class with four powers. This class is already somewhat known to you from containing the Cruciform family. Do you remember the characteristics of this family?

L. Yes; the petals have the form of a cross. I have been examining some of them since you told me of their powers in curing scurvy; the calyx, I find, has always four sepals, and the corolla four petals.

E. There are only two orders in this class, distinguished by the simple circumstance of containing either broad or long pods; the pods are receptacles for the seeds of flowers. The petals are generally of a white or yellow color, very rarely a purple. They are never poisonous.

The first order is Siliculosæ, or that with short or round pods. The Pepper Grass is here, which you must remember from its sharp biting taste. So is the Shepherd's Purse, named from the peculiar pouch-like form of the capsule, This has been described as an unsightly annual weed, with but little to recommend it, running only too quickly over neglected gardens and wastes, and has made itself a denizen of the whole habitable world. The Candy Tuft, Cress, and Moonwort or Honesty, as it is sometimes called, are in this order also.

The second order is Siliquosæ, or that with a long and narrow pod. The Wall flower, the most beautiful and interesting of the class, is in it. We are told that the minstrels and troubadours of former days carried a branch of this flower as an emblem of an affection, that continues through all the vicissitudes of time, and survives every misfortune. It loves to grow in in the crevices of old walls, to flourish in those of ruined towers, or ornament the mouldering tablet, which records the names of those almost forgotten by sorrowing relatives. Here is also the Radish, Rocket, Mustard and Woad, an article much used by dyers; the last belonging, Nuttall thinks, much more properly to the Siliculosæ.

L. SONG OF THE TETRANDYAMIAN TRIBES

Blossom of the time-worn tower,
  Fragrant *Wall-flower* thee we bring,
To be our chieftain's chosen flower,
  And round his paths thine odors fling,
Emblem of love, sincere and warm,
And friendship that survives the storm.

Oh ! faithful flower 'mid grief and woe,
  Still wreath the tempest shaken tower,
And on the mourner's pathway throw
  Thy sweetest scent, thy fairest flower:
Still blossom on the early grave,
And o'er the scene of ruin wave.

E. We must now consider the brotherhoods, as the names of the three next classes signify. And first, Monadelphia, or one brotherhood. In this class are included all those flowers that have the filaments of the anthers united in one set, thus forming a tube at the bottom of the corolla. The orders depend on the number of anthers or pollen boxes.

L. You cannot then have an order Monandria, it would be in the class of that name, as it takes more than one to be united with another.

E. Certainly not; the first order is Triandria, in it is the Sisyrinchium, which is common in our fields and meadows about midsummer; it very much resembles a miniature Iris, from its bright blue flowers and narrow grass like leaves.

The next order in it is Pentandria, which contains the Passion Flower; this is a climbing plant, peculiar to the warm countries of the Western Continent. In the South American forests, its long and many times woody branches climb up to the tops of the loftiest trees, and send out tendrils from one to another, until the whole are securely bound fast. So strong, too, is this hold, that it has happened that a tree completely severed below has been prevented falling. Elevated, or trailing, as it sometimes does upon the ground, its flowers surpass any thing else in nature. The superstitious Europeans that first beheld it, observing the singular appearance of the flower having ten petals, which were fancied by them to represent the ten Apostles, except Peter and Judas, one of whom had denied, and the last betrayed his Master. The stamens were compared to a glory, and the small purple threads at the bottom of the style to a crown of thorns; the style to the pillow on which the malefactors were bound; the clasper to the cords, and the palmate leaf to the hand; the three divisions at the top of the style were the nails; in fine, they found in it the soldiers who cast lots, and every thing else fancy could wish, even to the three days in which the Saviour lay in the tomb, which is the time that elapses between its opening and closing in its native country. From all this they considered it created at the time of the Saviour's crucifixion, and thus commemorative of his passion or suffering to those of the New World, who could not otherwise see it. The Storksbill Geranium is also here.

The Geraniums mostly fill up two orders, Heptandria and Decandria. The Order Polyandria contains a great number of splendid flowers, comprising a large natural order, much subdivided by modern botanists. In this place are the Hollyhocks, to which all the rest bear considerable resemblance. The genus Malva is here, as also the Althea or Marshmallow, and the Sea Tree Mallow—Lavatera, which is much cultivated in our gardens. On the rocky coast of England it is described as unfolding its large purplish red blossoms to the sea breeze from its towering stem of five feet.

L. SONG OF THE MONADELPHIAN TRIBES.

We come the highway sides to grace,
And to strew the banks with *Malva* flowers
With gay Geraniums varied race,
We have decked the lanes and woodland bowers.

On the marsh in the shade of verdant hills,
Her blossoms *Althea* delights to rear,
And deep in her green retreat distils
The healing balm to the shepherd dear.

Boldly we brave the blast and storm,
Unmoved by ocean's tempestuous roar,
While fair *Lavatera* erects her form,
And hangs her wreaths on the sandy shore.

SEVENTH CONVERSATION.

E. The Class Diadelphia, or two brotherhoods, includes all those flowers that have three stamens connected at the bottom, but divided into two sets. It includes a great natural order which Linneus called, from the butterfly-shape of the flowers, the Papilionaceæ, from a word meaning butterfly. Here is a *Sweet Pea* blossom, in allusion to the shape of which Keats remarked:

Here are Sweet Peas on tiptoe for a flight,
With wings of gentle flush o'er delicate white.

This large piece on top covering the others is called the *standard* or banner, *a;* you will notice as I take this off how it is inserted by a projecting part into the side pieces, evidently to keep it from being shaken off by the winds. The two side pieces *c* are now exposed, these are wings, you see how strongly they are inserted with the remaining part of the corolla, evidently for the same purpose as the other. All that now remains is the keel *b* (*carina*) of the boat covering, the stamens, and pistils. Whenever rain approaches, the parts successively close one within the other, until all are perfectly protected from the storm. The stalk that sustains the flower is very slender and flexible, so as to turn with the current of air, and thus present its back to the wind and rain.

L. Do the number of anthers distinguish the orders in this class?

E. Yes. The Petalostemons are the flowers, you remember, which you were so much surprised at in retaining their colors when dried and kept for years in the herbarium. They are among the handsomest of preserved flowers; the simple low clustering stems are so well shown, and the cylindric heads of pink and reddish purple flowers look so very natural, that I do not wonder they often occasion surprise when dried. This, as well as the Fumitory, are among the first orders. The curious looking Corydalis, often called Dutchman's Pants, is also here.

But leaving these for more important plants, we must mention the Pea and Bean tribes, Indigo, Liquorice, Gum Arabic, and Tamarinds. The Lupine is here, about which Mrs. Lincoln mentions a traveller's story of the Banks of the Nile, being visited at night by the Hippopotamus or River Horse, a large animal that does great damage to gardens and fields, and that the inhabitants destroy him by placing quantities of lupine seeds in his way; he devours these greedily, but they soon swell in his stomach, and produce such distension as to cause death.

The Furze is also here, as well as the Brooms, on seeing which Linneus fell on his knees in tears and prayed, enraptured with their golden beauty. Last, but not least, in this class, I will mention the Milk Wort—Polygala, that forms the type of a natural family. The most useful among its species is the Seneka Snake Root, much used in medicine, and one of the ingredients of the common Hive Syrup of the shops.

But I had almost forgotten to mention a very strange plant indeed, the Hedysarum Gyrans, a description of which you will find in the words of Linnæus himself in this book, and which you may read aloud.

L. The moving plant is, as Linneus observed, wonderful, on account of its voluntary motion. No sooner, continues he, had the plants raised from seed acquired their tenate leaves, than they began to be in motion this way and that. This movement did not cease during the whole course of their vegetation, nor were they observant of any time, order, or direction; one leaflet frequently revolved whilst the other on the same petiole, was quiescent, the *whole* plant was very seldom agitated, and that only during the first year, but sometimes most of the leaves would be in motion at the same time. This motion does not depend on any accidental or external cause, such as touching, heat, cold, light, or darkness, for they will neither excite it nor prevent its continuance.

SONG OF THE DIADELPHIAN TRIBES.

Our spendid sails like the butterfly's wing,
Are gay with the rainbow's hues.

And our silvery keels sweet odors fling,
As they sweep the morning dews.

The treasures of gardens and cultured plains
We bear on our gallant prows,
Feast for the flocks, and the shepherd's swains,
And plumes for regal brows.

Come taste our sweets, come wreathe our flowers,
While the sunbeams gild our sails,
For we fold them whenever the dark cloud lowers,
And tempt not the stormy gales.

E. The Class Polyadelphia is the last of the brotherhoods; it comprehends all those flowers whose stamens are united by their filaments into more than two sets. It is a class of very little importance and now fallen into disuse, its flowers being distributed among the other classes. Do you remember what the other class was that botanists treated in the same manner?

L. Dodecandria, or from eleven to twenty stamens, placing them in Polyandria and Icosandria. All whose stamens were inserted on the calyx in the latter, and in the former, those whose stamens were inserted on the receptacle.

E. As the characters of this class were very inconstant, they thought best to add it to Polyandria. As I before mentioned, its orders depend on the number of stamens. The Chocolate and Orange trees are here, with the far-famed St. John's Worts, which were formerly held in great esteem for their healing virtues, but have now fallen into disuse. The Druids used them in their incantations, and from them superstitious observances have descended among the poorer classes of England and other European countries. The peasant girls in Lower Saxony have a superstitious practice of gathering the flower on midsummer night, and prognosticating the prosperous or adverse fortune of the coming year, by the state of the gathered branches the next morning. The Welsh also hold this plant in high regard, and no doubt derive their superstitious reverence of it from the Druids, who ranked it amongst their sacred plants and made use of it in some of their mystic rites.

L. SONG OF THE POLYADELPHIAN TRIBES.

Come follow *Hypericum's* golden star,
It will lead to where happiness dwells afar,
With nature in peaceful shades;
It will lead to the green hills flowery brow,
Or by hedge-row paths in the vales below,
Or through turfy forest glades.

Pluck not her flowers like the Saxon maid,
Nor anxiously watch if they flourish or fade,
By the moon of a midsummer night;
Nor aloft as a spell hang her tassels of gold,
Like the Cambrian swain, nor like Druids of old,
Bid them wave in mystic rite.

But follow with light steps the golden star,
That guides you to treasures more sterling far,
Than cities or courts can give;
Dear nature has pleasures in every hour,—
Ah! love her in youth and you learn her power
To charm you as long as you live.

E. Our present class, Syngenesia or flowers, with a union of anthers, contains a great number of the vegetable tribes of the late flowering kind, mostly blooming sometime in autumn. What were the characteristics of the brotherhood or delphian classes?

L. A union of the filaments while the anthers were separate.

E. Exactly the reverse of that is the case in this instance. This class, however, is distinguished by the compound characters of its flowers, several hundreds, and even thousands, being on the same stalk next each other, and giving to the casual observer the idea of a single flower. But let him examine closely, and he will find an astonishing number of perfect little flowers, each, in most, if not all cases, with its calyx, corolla, stamens, and pistil. It seems as if nature had made up an immense number of minute flowers, so many, indeed, that it was difficult to find stalks for all, and so was forced to crowd them off her hands in bundles. From this circumstance they are incorporated into a natural order, called the Compositæ. This class contains many valuable medicinal herbs. It has five orders:

And first Polygamia Æqualis, in which the florets on the flower are all perfect, each having five stamens and one pistil; and producing one seed, such are the Dandelion, Boneset, and Thistle. Every one has noticed the balloons of the Dandelion, each of which is a seed with its calyx turned into a light chaffy substance to bear it away. The blue flowers of the *Succory* show here also.

Secondly, Polygamia Superflua, in which the florets are all perfect and fertile, those of the circumference having no stamens, rather filaments without anthers, hence the name applied to the filaments; such are the Tansy, Wormwood, Starflower, Coltsfoot, and Daisy, about which last John Mason Good wrote some very beautiful lines, which you can read from the book.

L. Not worlds on worlds in phalanx deep,
Need we to prove a God is here,
The Daisy fresh from winter's sleep
Tells of his hand in lines as clear.

For who but he that arched the skies
And pours the daysprings living flood,
Wondrous alike in all he tries,
Could rear the Daisy's purple bud?

Mould its green cup, its wiry stem,
Its fringed border nicely spin,
And cut the gold embossed gem,
That set in silver gleams within?

Then fling it unrestrained and free,
O'er hill and dale and desert sod,
That man where'er he walks may see
In every step the stamp of God.

E. Polygamia Frustanea consists of radiated flowers, the disk ones of which are perfect, but those of the ray almost petals, having most generally an imperfect seed at the base, from hence the name denoting its being frustrated; such are the Sun Flower and Blue Bottles—Cyanus.

Polygamia Necessaria has the rays fertile, and those of the disk constantly sterile. We are told they may be easily known by producing its seed principally on the margins of the disk. Here are the Marygold and Leaf Cup.

Polygamia Segregata comprises a set of doubly compound flowers, each one having a double calyx, one common to the whole head of flowers, and one for each separate floret in the set; such are the Elephant's Foot and the Globe Thistle.

L. SONG OF THE SYNGENESIAN TRIBES.

Though we boast not *Triandria's* corn and grass,
Yet our *Thistles* feed the laboring ass,—
And the small birds rejoice in our leafy bowers,
As they feed on the seeds of the *Groundsel* flowers.
With us the Cerulean *Cyanus* is seen,
And our own fair *Daisy* decks the green,
And the *Succory* opens its azure eye,
Beneath the light of the summer sky.
Fair are our flowers, but yet more fair
Are the seeds that lightly float on the air.
When the fading blossom has lost its grace
A feathery down supplies its place;
And wafts the seed on the passing gale,
To its rightful home on the hill or vale.
These winged seeds are thickly stored
In the urn of the purple *Salsify;*
The *Colt's foot* keeps a secret hoard,
And in the *Camomile* cups they lie.
Chief of the woodlands, and queen of the meeds,
Accept our fair flowers and our downy seeds.

EIGHTH CONVERSATION.

E. The name of the next Class Gynandria, or union of stamens and pistils, is taken from the fact of the stamens in its flowers really growing out from either the germ or style of the pistils. When the stamens cannot be counted from their indistinctness, we call the masses of gluttinous pollen *Pollinia.* The orders in this class, as in many of the ones we have been over, are taken from the number of stamens.

The first order, Monandria, contains the Orchis tribe of plants. The flowers in it are remarkable for their grotesque appearance. The Geraniums copy the scents of other plants, as the Rose, Lemon, Orange, and Balm; this tribe does the same, strange to say, to the forms and colors of animals, and, accordingly, presents us with the figures of flies, spiders, birds, and even men, colored to the life! So closely does the Bee Orchis—Ophrys, resemble the insect, whose name it bears, as to look, at a very short distance, quite like a bee hovering, with outstretched wing, over a flower. But very few bloom at a time on the plant that bears it so that the illusion is complete. The white Helleborine—Epispactis, displays its spotless blossoms here, as does the Neottia—Ladies' Tresses, of which we have many species common both in dry sandy woods and wet meadows. They come out in fall, and have all white flowers inclined to one side, and form a twisted or spiral wreath. The Lily Orchis—Listera, and the Arethusa, which is not over a hand high whose elegant and curious purple flowers may be seen in mossy swamps, blossoming in June, will close the first order.

In the second order, Diandria, is found the Ladies' Slipper—Cypripedium, great numbers of which enliven the plains of Illinois, and are called by the people Indian Moccasins. These, as well as the whole Orchis tribe, occur in rich shady woods, far away from human ken. At one time their cultivation was thought impossible, but that idea has proved a fallacy, and considerable attention is at the present time paid to them.

In this class is also the Silk Weed, Birthwort, and Indian Ginger, but we will now pass on to the next.

L. SONG OF THE GYNANDRIAN TRIBES.

In the quiet shades
Of our forest glades,
The fair *Epipactis* her blossom unfolds,
And the *Orchis* race
Our field banks that grace,
The wandering shepherd with wonder beholds,

In our pastures green
Ladies Tresses are seen,
In our woods, *Cypripedium's* purple flower,
And Listera there
Her nest doth prepare,
And bright *Arethusa* adorns our bower.

With insect gems
On their verdant stems,
The *Ophrys* tribe in our borders we see,
Queen of the flowers,
These treasures are ours,
And we bring them with loyal hearts to thee.

E. Monœcia and Diœcia are fashionable classes, affecting the manners of the higher ranks in the old countries; the married couples not occupying the same apartments. In Monœcia, or one house, are those plants which contain stamens and pistils in separate flowers on the same plant.

L. And it is for such flowers you said, that some think the nectary was added to tempt bees to distribute the pollen.

E. Yes; but where they are both on the same plant the wind alone can often do it, even if no other contrivance in the flowers was discovered. In the class are included a great variety of the forest trees. The stately and majestic oak that shoots out its right angled branches, and with its spreading foliage gives an air of grandeur to the landscape, is here, with its neighbours the Beech and goodly Chesnut. The Birch that will endure almost any degree of cold, creeping up even beyond the pines in the polar regions, though it can there attain but the height of a few inches, and growing where little else can grow in the English marshes, Irish bogs, and Scottish peat mosses. This beautiful and elegant tree, despite its rather humble growth, has been made the emblem of the Highland Clan Buchanan.

L. Has this class any orders?

E. Yes; determined by the number of stamens. As might be expected, many of these that are common in Scotland, emblemize the Highland Clans there, thus, the Pine is the badge of the McGregor; the Box of the Mackintosh and the Oak of Cameron. The Hazel Tree, from its nuts, you are no doubt well acquainted with; it never attains the height of a timber tree. The wood it produces is very useful. Early in spring it hangs out its curious fruit-flowers, or catkins, in which the bright crimson dots make a beautiful appearence. Walking Canes, Fishing Rods, and Charcoal, are made from this wood. It is the badge of the Highland Clan Colquhoun.

Here is also the Mulberry, upon whose leaves the Silk Worm feeds, as well as Indian Corn, about the dissemination of whose pollen, Flint says, that nothing is more charming, considering it the most beautiful vegetation that any can offer. When the southwest breeze whispers, and a slight humidity inspires a voluptuous languor, in riding by these noble fields of maize, the pollen floats along the forest spikes, like a delicious shower of aroma, with a fragrance more delightful than ever breezed from the spicy fields of Araby the blest. Then the the different kinds of maize growing near each other are intermixed upon the same ear. What is called the silk of the ear conveys this pollen to the kernel and fructifies it. When there is not a silken thread to convey the pollen to the kennel, the grain will be found wanting. The most important tree in the class for food is the Bread Fruit.

The Cat Tail—Typha, improperly used by some people for filling bed ticks, as it answers much better for making mats and seating chairs. The Sedge—Carex, is a coarse grass of little apparent use; and as we have said enough about the orders we will finish with the Arrow-head—Sagittaria, so common in muddy waters, and mentioned in the verses you like so much, called Little Streams, and the Spurge—Euphorbia.

Little streams have bowers a-many,
Beautiful and fair as any;
Typha strong and green *Bur Reed*
Willow Herb with cotton seed;
Arrow Head with eye of jet,
And the *Water Violet*,
There the flowering rush you meet,
And the plumy *Meadow* sweet;
And in places deep and stilly,
Marble-like the *Water Lily*.

L. SONG OF THE MONŒCIAN TRIBES.

Queen of the Meadows we bend to thy sway,
And gladly our sylvan tribute we pay;
From the flowing stream we bring to our chief,
Sagittaria flowers with their arrowy leaf,
And the reed like *Typha*, the sceptre fair,
That our rural Sovereign delights to bear.
Euphorbia we bring from the wild sea shore,
And the sedgy *Carex* from lake and moor.
Nor these alone our treasured store,
For our *Beech*-masts fatten tbe forest boar,
We have Cameron's *Oak* and McGregor's *Pine*,
And Buchanan's *Birch* to yield us wine,
And Highland *Hazel* of bold Colquhoun,
While Mackintosh brings the box for a boon.

Queen of the Meadows we bend to thy sway,
And gladly our sylvan tribute we pay;

E. The class Diœcia, or Two Houses, contains those whose stamens and pistils are in separate flowers on separate plants; the orders, like the former, depend on the number of stamens; hence there is but little difference between this and the Monœcian class, it containing, like the latter, many forest trees.

Perhaps the most remarkable genus in this class is found in the order Triandria—the Ficus, or Fig, noted for containing the flowers within the fruit. What is commonly termed its fruit is only a large hollow pear shaped juicy receptacle within which the minute flowers and seeds can be discovered by a good microscope; it has a small orifice on the top with a kind of scaly valve. It was formerly supposed that the pollen of the male flowers was carried to the stigma of the female by means of small flies that may be seen fluttering from one fig to another.

L. I have heard a description of that before, and it has been adduced as showing the wonderful care of Providence.

E. That the flies really carry the pollen has been disputed. In hot climates the fig produces two crops of fruit, but to do this the gardeners have to hasten the ripening of the first in order to leave time for the second to come to maturity. We are told that the peasants in the isles of the Archipelago, where the first abounds, bring branches of the wild Fig Tree in the spring, which they sprinkle over those that are cultivated.

L. That reminds me of what you said in relation to carrying male flowers of the Date Tree and shaking them so as to sprinkle the pollen over the stigma of the female to ensure fruit.

E. Some, however, consider the cases very different, and assert that the only use of these wild branches is to serve as a vehicle for an immense number of small insects called Cynips, which perforate the Figs in order to make a nest for their eggs, and the wound they inflict causing considerable irritation and excitement which accelerates the ripening of the fruit. In many cases the Fig contains perfect flowers, though in most they do not.

Another species of this genus is the Banyan Tree, which sends forth branches that falling to the ground take root, still remain connected with the parent trunk, and in turn send out, as soon as they grow old enough, others that follow the same example. Each tree is soon a grove and continually increases in size and numbers, until some are known to be large enough to give shelter to seven thousand men. The leaves are large, soft, and of a lively green, and the fruit, a small Fig of an agreeable flavor, which, when ripe, is of a bright scarlet.

The India Rubber Tree is of the Fig tribe also, it exudes a milky juice, which, when dried and darkened, gives it the name. Nearly allied to this is Humboldt's celebrated Cow Tree that exudes, upon making an incision, a great amount of a cream-like, wholesome, and nutritious drink. But I must leave this genus to mention the Hopvine—Humulus, and the Black Briony—Tamus, with long wreath-like branches, and shining dark green leaves, and its red berries hanging in festoons. The Aspen is well known by the constant quivering of its leaves. The Yew Tree, noted for its elasticity, and hence, used for making bows; its juice is poisonous and in olden times the arrows were dipped into it to render the wounds fatal, they might inflict. The Bay Berry, or Sweet Gale—Myrica, whose elegant sprays deserve to find a place in a lady's wreath, not only for its beauty, but for the delightful fragrance it exhales from its berries and leaves when rubbed between the fingers. In some places the people make beds of its twigs, and in others, scent their clothes with its leaves; the poet says:

> *Gale* from the bog shall waft Arabian balm.

I will dismiss the class with the mention of the Willow, Mistletoe, and Rafflesia, the last the most extraordinary flower known. It was discovered in the Island of Sumatra, by Dr. Arnold, in 1818, and called by him the magnificent Titan of the vegetable kingdom. To increase the wonder, it is entirely destitute of roots and leaves, the blossom, the like of which the mind of man had never conceived the existence of, forming the entire flower. It was attached to the stem of a grape vine, the circumference of the full expanded flower is nine feet, its nectarium calculated to hold nine pints, and the pistils as large as cows horns; the whole weighing about fifteen pounds. The color is a mottled yellow. Since that time other species have been discovered but not quite as large.

L. SONG OF THE DIŒCIAN TUBS.

Princess, we lay on the floral shrine
  Light wreaths the graceful *Humulus* weaves;
Our northern myrtle with these we twine,
  The sweet *Myrica's* fragrant leaves.

The dark festoons of the *Tamus* cling
  To the silvery willow's bending spray,
Whose blossom like down from the cygnet's wing
  Sheds a golden light on the vernal day.

The pearly tufts of the Misseltoe
  With many an evergreen leaf we bind,
And the *Aspen's* slender bows that throw
  Their trembling leaves to the summer wind.

In the battle's shock our tribe has stood
  Renowned for many a valorous deed,
And our faithful bows of the *Yew-Tree's* wood
  Shall guard our Queen in the hour of need.

NINTH CONVERSATION.

E. Polygamia, or the class of many marriages, consists of plants with stamens and pistils united in the same flower, besides others in separate flowers having a different structure. Like Dodecandria and Polyandria, modern botanists have totally abolished it and distributed the flowers among the other classes. To say the least, it is an extremely inconvenient one in practice. Its orders are founded on the preceding classes Monœcia, Diœcia, and a third, Triœcia. Even while it was retained the genera continued dwindling down till the Ginseng and Orache, or Purselane, were the principal of what were left.

L. SONG OF THE POLYGAMIAN TRIBES.

The silvery *Purslane's* simple flowers
  An humble prize, we mostly claim,
We have no roses in our bowers,
  No fragrant blossoms known to fame.

Unknown and unadmired our race,
Springs up and blooms and fades away,
And few have sought our resting place,
Or watched our buds from day to day.

Yet in the simplest blossoms dwell,
Such proofs of power and wise design,
As to the wandering spirit tell,
The hand that formed them is divine.

E. Our last Class Cryptogamia, or Concealed Marriages, forms in itself a ground division of the vegetable kingdom. In all the flowers in it, neither stamens, pistils, or proper seeds, are recognisable even by the microscope ; a different arrangement prevails. Their propagation is carried out by means of sporæ, which though confessedly the most simple of all organized bodies have appropriate receptacles provided for them, proving, as Nuttall remarks, the existence of the universal law of nature, that without a parent mediate or immediate, neither animal nor vegetable, in whatever part of the scale of existence they are found, can possibly have a being.

It has been said that Linneus having arranged the plants that would admit of classification, took the remainder and cast them into a heap together, which he called Cryptogeamous. He found it impossible to arrange this class in any other way than by its own natural affinities or resemblances pointed out by nature, of these he made six.

1*st.* The FERNS, may be known by their plume-like leaves, which are called *fronds*, being of one continued substance with the branch. The fructification, or fruit making apparatus, is generally on the lower surface of the front, in the form of round or oblong dots, which consist, upon being placed under a magnifier, of thick clusters of very small, rather flat, circular capsules, which at first are whole, but afterterwards burst and scatter to a great distance an impalpable powder.

Here is found the Maiden Hair, about which it has been beautifully remarked that botanists have in vain sought to find out its nature, it having seemingly determined to conceal from their learned researches the secret of its flowers and its fruit. It confides to Zephyr alone the invisible germs of its young family. The Creator of all things selects the cradle for its children; and it pleases him sometimes to form a sombre veil with their waving tresses which ever conceals from vulgar gaze the cave where the solitary Naiad sleeps, and where she has slept from the beginning of ages; at other times they are borne on the wings of the wind to the summits of lofty towers, or the tottering remnant of an old chateau, where they shine like verdant stars; and sometimes disposed in light festoons, they adorn the retired and shady spots which shepherds love. Thus this wild plant is not to be understood by science, but hides its secret origin from our curious enquiries. It is the prettiest of all ferns, and Pliny states that though you plunge it in water it will still remain dry.

The Royal Osmund or Flowering Fern, is another noble and stately species. It is most common in our dark swamps, on it the capsules are very conspicuous. The Fragile, a most elegant species, is also here, noted for its extreme brittleness, as also the Lycopodium, which Nuttall considers the most elegant and curious Fern in the United States. Some of the species of Fern, in tropical countries, attain a height of thirty feet. The number known amounts to near a thousand, which are all most abundant in moist and shady situations.

2*d*. The Mosses are little herbs with distinct stems. Mungo Park, when travelling, was once greatly discouraged by the difficulties which environed him on a distant excursion, and was fast sinking under his troubles, when looking at some Moss beneath his foot, he was so struck with the providence of God exhibited in its formation, that he resolved never to despair, knowing that the same kind care was over all his creatures. Exiled from cultivated ground, they advance toward barren and untilled land, covering it with their substance, and, thus not only furnish a beautiful green carpet when nothing else can be seen, but also when they perish lay a foundation upon which larger plants may find support. You know Wordsworth's lines on the Moss, do you not?

L. There is a fresh and lovely sight,
A beauteous heap, a hill of moss
Just half a foot in height;
All lovely colors there you see,
All colors that were ever seen:
And mossy net network too is there,
As if by hand of lady fair
The work had woven been;
And cups the darling of the eye,
So deep is their vermillion dye.
Ah me! what lonely tufts are these
Of olive green and scarlet bright;
In spikes in branches and in stars,
Green, red, and pearly white;

3*d*. The LIVERWORTS, which are thicker and more juicy than the Mosses. There is some dispute on account of the origin of the name. A number supposed it to be derived from the virtue it was formerly thought to possess in curing diseases of the liver, and the rest think it arose from their resembling the colors of that organ. The Juggermannia are the most common plants in this order.

5th. The SEA WEEDS, a name that needs no explanation. A common plant in it is the Gulf Weed, found floating in the Gulf of Florida, sometimes forming floating fields many miles in extent. One of its species, named the Gigantic, is said to be over six feet long, another forms a good manure, and a fourth is boiled with meal in Lapland, and given to cattle for food. On burning, many of them afford an impure soda called *Kelp*.

5th. The LICHENS, which vary in texture, form, and color, being woody, leathery leaf-like, and white, green, or black. Many of them are exceedingly useful for many purposes in medicine and dying. They mostly resemble trees in miniature. You have often eaten jelly made of the Irish, and Iceland Mosses.

6th. The MUSHROOM tribe, never exhibiting any appearance of green herbage, generally corky, fleshy, or mould-like, varying in form and color. All are of quick growth, and very short duration; they grow mostly in dark and underground situations.

L. Catsup is made from them is it not?

E. From some, not from all, for many are poisonous. We are told that the Ostiacks, a Siberian tribe, make a preparation from one of the species that will kill the most robust man in twelve hours. Several of our Mushrooms are almost as dangerous, as there is a liquid hid within them of a nature so acrid that a single drop on the tongue will produce a blister. The Russians during their long fasts live entirely on this tribe, and are afflicted in consequence with violent convulsions in many cases.

L. Is there any method by which the good can be distinguished from the bad? if not I will eat no more Catsup.

E. Yes. The eatable species is known by its convex, scaly, white cap, or head, which is mounted upon a stalk. The whole is at first covered by a wrapper that bursts by the sudden growth of the upper part, and in many cases we can see the remains of it in the form of a ring below the head. The Tuber Mushroom is collected for food in Europe and Asia; it is round and solid, grows above the ground, has no root, and when old becomes warty and dark colored. There is another of this last kind, distinguished as a favorite article of food, and by growing under ground. It is described as being as large as the human head, resembling much a Cocoanut, and covered with a dark, rather woody-brown bark. It is filled with a fleshy corklike matter when ripe, simulating in color the flesh. But we have had enough of this class and will conclude with the crimson cup-like form of the Peziza.

L. SONG OF THE CYPTOGAMIAN TRIBES.

Chieftain from our varied store,
  What tribute shall our tribes provide,
We have gems on ocean's shore,
  And beneath the flowing tide;
And many a precious treasure laid
On the mossy banks in the forest glade

We will bring our gallant chief
  The waving locks of *Maiden-hair*,
And *Fragile* with graceful leaf
  For lovely dames to wear;
And the *Royal Osmund's* palmy bough
A plume that suits a warriors brow

Chieftain, to thee we duly bring
  Our countless gifts from land and sea,
And lo! to crown our offering
  The nectared draughts we pour for thee.
Peziza's lowly daughters bear
In their ruby cups so rich and rare.

E. We have now finished with the twenty-four classes of Linneus. Do you remember how many modern botanists make of them, and what are the rejected classes.

L. O yes! there are twenty one left. The Classes Dodecandria, Polyadelphia, and Polygamia, being distributed among the others.

E. I am very much pleased to think you paid so much attention and have remembered our conversations so well. You can now tell the class or order of almost any flower you meet with, and that is certainly a great advantage. The knowledge you have acquired is a letter of introduction, making you somewhat acquainted with all the members of the vegetable kingdom.

L. But I suppose from the high idea you have of the natural system that it will teach much more than merely knowing the flowers.

E. Yes; for though the Linnean system is by far the best of any artificial plan known, it is in many respects very imperfect, for the number of stamens often varies in the same species. You will often find Tulips with from three to eight stamens.

L. How do they manage in such a case?

E. By discovering the number usually found and classing them accordingly. Number is very little to be relied on, but it is still that, you see, on which the whole system is based.

L. Then, if the system is so very imperfect, why did you take such pains to induce me to learn it?

E. Without understanding it you could make but little proficiency in botany, for the majority of the works written on it are based upon the Linnean system.

L. What is the great difference between the two systems?

E. That of Linneus considers only the organs of fructification, or the stamens and pistils, while the other takes the most important parts of the plant, the fruit and seed. But you must remember that the information you acquire in learning one will be of great use in studying the other. So far from the natural being a perfect system, many eminent botanists of the present day have used the former in preference.

The truth is, as I remarked to you before, that knowledge of species is the important consideration, so much so that it is asserted that no one can *be entitled* to the appellation of a botanist until that person has dissected and gathered at least three hundred different plants.

TENTH CONVERSATION.

L. Why is it, Emily, that by cutting off a slip from a rose bush and planting it I can have another bush as large as the first? Does the end of the slip begin to rot and then turn into roots, merely because it is put in the ground? I remember reading a fact stated in a book, which said that it made no difference what part of a plant was put in the ground, all would in such a case equally change the offices: that if a tree was turned upside down the former roots would change to branches and bear leaves, and the old branches and leaves turn to roots.

E. That was a wrong statement; but to explain why it is so, I must take a somewhat round-about-way of making you understand what I mean. You know what a polypus is, I presume?

L. O yes; I have many times cut them in pieces and the separate parts became distinct and whole animals. I have besides seen them growing out from one another, somewhat like the branches of a tree.

E. That class of animals rank the lowest, as might be expected, in the Zoological scale. Their organs are very simple, and of course, so are the functions or offices of these organs. They possess sensation, and can move about, but their only use is seemingly to imbibe nourishment. A great many polypi are generally together in one body, and that accounts for the separate bodies which each developes for itself when cut off from the others. They resemble plants in that particular; you cannot find a single plant or a single polypus.

L. What! is not the rose growing in that pot a single rose?

L. On the contrary, it consists of a multitude of them; there are thousands of life germs scattered through every part that require but a little irritation to excite them and produce an active state of existence. Cut off a slip of your rose and you irritate the parts and excite the germs; each germ sends downward a root, and upwards a stem, and you thus have another plant.

L. Then I suppose when the tree was turned upside down the irritation was sufficient to excite a great many germs that gave out roots below and ran upwards to the old roots to form leaves and branches alone.

E. Exactly so; and on those facts are founded the theory of the propagation of plants by subdivision, for doing which there are three modes: by layers, scions or slips, and grafts.

L. Still I cannot exactly see why producing irritation and exciting them should be sufficient to cause these germs to grow. It appears to me that planting seeds is the only true way of raising vegetables.

E. You can remember in one of our previous conversations, I mentioned Cotyledones or little cavities, which contained nutritious matter for the nourishment of the young embryo or life germ, that was joined to each. This little store of matter, answering the same purpose for the future plant, as the yolk of the egg did for the young chick. Well, the principal office of seed making is the enclosing of a little embryo in a case, with enough of food proper for it while germinating.

L. But if I plant the seed of an apple it will by-and-by become a tree, without the juicy matter that is around the seeds, as they can do without it. What use is that portion?

E. To supply the wants of man. Nature's first object is to secure the continuation of the species by careful attention to the preparation of the seed apparatus. When that is done she does something for man, but never before.

L. Are there other instances, except in the common fruits, where she bestows such attention?

E. Many; but among the most remarkable are the Silk Weed and Cotton; the long down which surrounds the seeds enclosed in the capsule with them, answering no purposes whatever, except for the uses to which man applies the matter their separation.

L. You were going to explain the germination of the embryos by irritation?

E. The seed, then, is merely an embryo enclosed in a little storehouse of food; putting it into the ground and exciting it to action—which action it is enabled to sustain on account of the supply of food—will ensure its growth. The germs that exist throughout the plant, are of course, destitute of this supply, or the seed making process would be unnecessary. Now to ensure the sprouting you must make the proper kind of irritation, and place it in favorable circumstances to answer two objects, 1st, exciting the germ, 2d, giving it sustenance while germinating.

Its excitemennt is easily produced, but the other is more difficult. It is a law of vitality, that if any part of a living body is excited the vessels carrying fluid to that part will become enlarged and carry much more than their usual supply. Causing this first action around the germ will give it the required food, and thus, instead of perishing, it sprouts forth, and is either a fresh branch on an old plant, or forms an entirely new one.

In order to make a layer, we are directed to bend down a pliant branch without separating it from the plant, and fasten it in the ground, making a slight incision at the spot where it is confined. The requisite irritation is thus produced, a flow of pure sap takes place towards the part, the excited germ is supplied with food, the ground is convenient, and the germ soon shoots out. There are several creeping plants, observes De Candolle, which propagate themselves in this manner without the aid of man. Their lower branches trailing upon the ground, are often partially covered with earth washed over them by rain, and if in the operation they are slightly wounded by friction or the contact of any hard substance, such as gravel, or pebbles, roots strike out, the connecting branch with the parent, being deprived of nourishment by the rapacity of the young plant, rots and perishes; the separation being thus made, and the requisite organs developed, the layer becomes a new individual plant. Most Laurels and Evergreens are propagated by layers, which is besides the method used in Vineyards.

L. It must be somewhat on the same plan that the Banyan Tree has such a number of offsets from it. I can conceive of nothing more simple than the bending of the branches to the ground and there taking root, and the branches that arise from them, though still connected with the first tree, sending out others in the same manner, and so forming a forest from a single slip.

E. There are many trees whose germs are so easily excited as to be noted for their extraordinary facility in sprouting. No matter what part you put in the ground, a root will take and a plant be produced. We are told that the Willow, Ash, and most trees of white wood, are noted for this readiness. Pope, the celebrated poet, chanced one day to be present on the opening of a package which came from Spain, and observing the sticks had some vegetation, fancied they might produce something new in England. With this view he planted a cutting, from whence sprang the parent of many of the finest and most admired specimens.

Mr. Humboldt, the celebrated naturalist, tells us that while travelling in America, he provided himself with strips of coarse patched cloth, which answered the purpose of baskets in confining the earth round branches from which he wished to make layers. He adjusted them round the branches of trees in forests which he intended to traverse on his return some months afterwards, when the germs would have time to sprout, and by this means took with him to Europe a number of curious and valuable new plants.

Grafting is accomplished by taking a portion from one plant and inserting it into an opening in another, in such a manner that they will unite and grow together. The cut branch is called the *graft* or *scion*, and the tree into which it is inserted, the *stock*. Plants of the same family can all be grafted indiscriminately into one another, a circumstance which the Dutch florists take advantage of, for they make different species and colors of roses grow on one trunk, and thus produce a beautiful effect. It is principally done for the sake of altering the flavor and size of fruits. We might continue this subject some time, even to the multiplication of plants by seed in all the various methods now used for that purpose; but you can pursue this part at your leisure to much better purpose.

L. I heard a beautiful thought yesterday that struck me very much, which was that no child has so richly ornamented a cradle as the seed when reposing in the recesses of the flower.

E. Beautiful as it is true! and the germ that is excited to action loses this cradle; but, as we have come again to the seed and flower, the beautiful will give way for a time to the wonderful, when I inform you that the green calyx slendidly colored corolla, stamens with yellow anthers and pistil, are all, in reality, nothing but mere leaves, and often change from these organs into such, when circumstances favor such variation.

L. Can it be possible!

E. Vegetable physiology is much more simple than you imagine, and by a little examination you will easily perceive the truth of the fact I have stated. The affinity the leaves of the calyx have to the common leaves of the plant, inasmuch as they are often of the same color and shape, and always perform the same office, is undisputed; sometimes the calyx is painted. The leaves of the corolla are in some instances of a green color, which fact, with various other matters, needless to mention here, proves their origin, the same as those of the calyx, or common leaves. The stamens, by excess of nourishment, will flatten and swell out, becoming blossom leaves, as well as the pistil; now and then a second flower, with calyx, corolla, &c., springing up from the centre of the first.

L. That must be the case, I suppose, with some of our garden flowers. I have often looked in vain for the pistils and stamens in our roses, they were too well fed, and must have thought if we had so much food to give them, we were able to afford luxuries, and so spent the material for seed in beautifying themselves.

E. Garden flowers will rarely answer for botanical purposes; wild flowers only are the ones to be relied on. The change I spoke of in relation to the conversation of stamens into pistils, may be seen, as it were, taking place in this monthly rose. On the outside is the calyx, inside this a great many petals, as you advance inward you see filaments with petals on them instead of anthers, and still further, the regular stamens, and in the centre the pistils.

L. I understand it all now; this monthly rose is a perfect instructor.

E. Gardeners have taken a hint from this, and sometimes when they have found fruit trees bear but little in too rich a soil, made the ground poorer, and been amply rewarded for their pains.

L. There were no stamens in that case. I suppose they had all turned into petals.

E. Or the tree itself become enlarged by a greater number of branches and leaves, for bearing fruit diminishes the number and size of both, besides soon wearing out the tree.

L. I should think the more fruit it bore, the more it would be able to bear; when it was in the right kind of ground and in the habit of yielding a large supply, why not continue?

E. A little reflection would soon show you the reason. Though immense numbers of germs are scattered throughout the tree, yet they are not inexhaustable, and just in proportion, as slips are taken from it, will the number of seeds it bears in each fruit diminish; every seed diminishes the number of germs left. As a matter of course, orchards that yield large crops of fruit must have a new set of trees every few years.

L. The Century Aloe, we saw some time since in Broadway, died directly after producing its flowers and fruit.

E. It had been many years accumulating the material with which to produce them. The Mexicans take advantage of this and remove the juice so that it cannot flower. They carefully watch the plant from the size of a little cone of leaves and roots, which is constantly increasing, the roots sucking up nutriment from the soil, and the leaves elaborating it, until there is enough to produce flowers; at this point it has an enormous size, and the leaves not being so much required, the outer ones begin to wither: this is the desired sign. It is tapped, and the great amount of juice that comes out fermented, thus making an intoxicating liquor, which is the common drink of the country. When allowed to flower, it sends up a central flower-stalk from eighteen to thirty feet in height, which, in turn, sends out over three thousand flowers, the nectaries of which distil showers of honey.

L. Something like the same thing happens with the Lilies in our yard, the long leaves, though much smaller, resemble those of the Aloe. They come out early and begin to work a good while before the flower stalks come up; after its flowers and its fruit is ripened, the stalks fall down and decay, but the leaves continue as fresh as ever, working until the frost comes and destroys them.

E. Your simile is a very good one. There are three kinds of plants: the Annual, Biennial, and Perennial.

The Annuals all come up from seed in the spring; they have fibrous roots that absorb the nourishment from the ground, and lay up a little capital or accumulation of sap. They spend this directly in flowering, dying in autumn, after the seed is perfected. When required for medicinal purposes, they are gathered just before flowering. Some farmers do this with their grasses, and so much nutriment do they yield in consequence, that they surprise their neighbors by fattening their cattle with them. Peas, Beans, and Cucumbers, are annual plants.

The Biennials, as their name denotes, live two years. As in the case of annuals, they come up from seed, but spend the first summer in laying up capital. Early the ensuing spring they sprout, sending up a stalk with considerably rapidity, and producing flowers and fruit, dying directly afterwards, as in the former case, both differing from the Century Plant, mostly in length of time. Such are Onions, Beets, and Carrots

L. Onions, Beets, and Carrots! why we take them out of the ground every year. They surely are annual plants.

E. You follow the example of the Mexicans, in waiting till the store is accumulated and then seizing upon it, precisely as you do upon the honey which the bee has been laying up all summer. Man, as lord of the earth, makes all things serve his purposes. Did you leave the plant alone, and some are always left for seed, it would, as I mentioned, sprout up and bear flowers and seeds. The store of nourishment it lays up causes the roots to swell and assume the various bulging forms in which you see them.

Perennials do not begin to flower until they have laid up considerable capital, and then do not ever spend the interest of it, but constantly add to the store. Such are Roses, Lilies, Oaks, and Apple Trees.

Large and long lived trees produce but little fruit at a time, and that always of a small size; the little Acorn, for instance, is produced on the Oak, and the Walnut on the Hickory; and the gigantic tree of Mount Etna is a Chesnut, with quite small fruit. Could it be contrived to induce them to yield plenty of fruit, they would diminish in size and soon die. A more effectual plan could not be tried to sweep off our tall forest trees from the earth. So that there are other reasons for Acorns growing on

Oaks and Pumpkins on the ground, besides the ones given in the story you told me you had read the other day. Will you repeat it?

L. Two gardeners once beneath an oak,
Lay down to rest, when Jack thus spoke:
" You must confess, dear Will, that nature
Is but a blundering kind of creature;
And I—nay, why that look of terror?
Could teach her how to mend her error."
" Your talk," qouth Will, " is bold and odd,
What you call nature, I call God."
" Well, call him by what name you will,"
Qouth Jack, " he manages but ill."
" Nay, from the very tree we're under
I'll prove that Providence can blunder."
Quoth Will, " through thick and thin you dash,
I shudder Jack at words so rash;
I trust to what the Scriptures tell,
He hath done all things always well."
Qouth Jack, " I'm lately grown a wit,
And think all good a *lucky hit.*
To prove that Providence can err,
Not words, but facts, the truth aver.
To this vast oak lift up thine eyes,
Then view that acorn's paltry size.
How foolish on a tree so tall,
To place that tiny cup and ball.
Now, look again, yon pumpkin see,
It weighs two pounds at least, nay three;
Yet this large fruit, where is it found?
Why nearly trailing on the ground.
Had Providence asked my advice,
I would have changed it in a trice;

I would have said, at Nature's birth,
Let Acorns creep upon the earth;
But let the pumpkin, vast and round,
On the Oak's lofty boughs be found,"
He said—and as he rashly spoke,
Lo! from the branches of the Oak,
A wind, which suddenly arose,
Beat showers of acorns on his nose.
"Oh, oh!" quoth Jack, "the wrong I see,
And God is wiser far than me;
For did a shower of pumpkins large
Thus on my naked head discharge,
I had been bruised and blinded quite;
What Heaven appoints I find is right.
Whene'er I'm tempted to rebel,
I'll think how light the Acorns fell.
Whereas on Oaks had pumpkins hung,
My broken skull had stopped my tongue."

ELEVENTH CONVERSATION.

E. Our conversation to-day will be on the adaptive power of nature, as shown in the vegetable kingdom and her various contrivances for preventing the extinction of her children, by the dissemination of seeds. You have noticed the bursting of the capsules that contain the balsam seeds, have you not?

L. Many a time; when they are fully ripe

I often go in the garden and touch them purposely to see them burst and hear their loud cracking, while the seeds are thrown in every direction, as if from the mouth of a little cannon.

E. Another, not less curious instance, is in the case of the common Dandelion, each seed of which, when ready for planting, is furnished with a little balloon to carry it off to another place; when it arrives there the balloon decomposes and nourishes it, answering the double purpose of transport and food.

L. I suppose the hooked seeds of the Burdock are made so purposely, so that it may cling to any passing object and thus be carried to different places. They often stick to me when I go near them, and I have seen great numbers on the wooly backs of sheep and the hair of cattle.

E. The wings with which many seeds are furnished often carry them across the seas. Linneus said, the seeds of the Erigeron were introduced into Europe from America by seeds wafted across the Atlantic ocean. The seeds, he observed, embank upon the rivers, which descend from the highest mountains of Lapland arrive at the middle of the plains and coasts of the seas. The ocean has thrown upon the coasts of Norway the nuts of the Mahogany and the fruit of the Cocoa-nut Tree, borne on its waves from the far distant tropical regions, which wonderful voyage has been performed without injury to the vital energy of the seeds.

Seeds are very tenacious of life, so much so, that those taken from Egyptian mummies, which have been accidently shut up in the process of embalming, have, when modern research has opened these mummies, and the seeds been taken from them and planted, sprouted and produced fruit.

L. The squirrels lay up their winter's store of nuts under ground; does not some of them, now and then, take root and sprout?

E. Very often; in fact so much so, that the Indians had a tradition in which it was asserted that these animals planted all the timber of the country. So extensive is the circulation of seeds, by various means, that climate alone forms a limit to their universal diffusion; this last is a boundary they cannot pass with life, so that each kind is confined within eternal although invisible barriers.

L. I have been reading a poem by Charlotte

Elizabeth, on the Vallisneria, a plant that grows partly under water, belonging to the Class Diœcia. The male of the Vallesneria has a long spiral stem, by which its flower is at all times enabled to adapt itself to the surface of the water, from the bottom of which the plant shoots forth, and to float in the middle of tide streams of almost every variation of ascent. The stem of the female is straight and much shorter, and is consequently only found in shallow waters, or on shores where the tide exerts but little influence. They thus live remote from each other and yet it is absolutely necessary that the pollen of the male should be thrown on the stigma of the female, or no seeds would be produced, and the species become extinct. The mode by which this is done, is, as Dr. Good remarks, truly wonderful for the distance, as well as the water, precludes the use of the wind or insects. As soon as the male flower ripens its pollen, its spiral stem dies by the want of the nourishment which is absorbed by the flower, so that at the moment of its perfection, the stem bursts, and the flower separated from it sails from shore to shore in pursuit of its companion, for the most part, driven by the current of the wind or stream. As soon as it arrives within a certain range of the female it obeys a new influence, and is instantly attracted to her in spite of the opposition of both wind and tide—a fact that has been proved in many instances; it then showers on her the pollen, and having fulfilled its mission, dies.

E. Will you repeat the poem ?

L. Offspring of the waters tell
By what undiscovered spell,
Thou art taught unmoved to rest
On the waves inconstant breast ?
When the rivers gnshing tide
Rising high and ranging wide,
Threats with overwhelming force,
All that needs her headlong course,
Still appears thy fragile head,
Still thy flowers the wave o'erspread.
Though the stream be sucked away
By the summer's thirsty ray,
'Till the meadow's children round
Wither on the parching ground,
Yet thy peaceful cheek I find,
On its liquid couch reclined ;
Whence the charm concealed and strange,
Suiting thee to every change ?

Lady, he who bade us dwell
Where the troubled waters swell;
Lent our stem a spiral power
Precious in the needful hour,

Though to earth our root be given,
Still we fix our view on heaven.
When the tides begin to rise,
Nearer we approach the skies.
How can waters overflow,
If the Lord support bestow?
As the rolling floods retire
Slowly coils the living wire,
Still contracting while we sink
Far beneath the grassy brink,
All unmoved our heads can rest
On the streamlet's shallow breast;
Lady how can we be dry,
If the Lord our need supply?

Favored flowret, from my heart,
Never may the lesson part!
Ne'er shall threatening waves of wo,
O'er the humble Christian flow;
God can bid the storm be still,
Or impart the needful skill,
In confiding strength to ride,
Buoyant o'er the furious tide.
Never shall the streams of grace
Fail in the appointed place,
While relying on His word,
Man undoubting trusts the Lord.

E. Dr. Good, mentions a plant called the Air Flower, from its curious habits. It is a native of Java and the East Indies, beyond the Ganges; and in the latter region it is no uncommon thing for the inhabitants to pluck it up on account of the elegance of its leaves, the beauty of its flower, and the exquisite odour it diffuses, and to suspend it by a silken cord from the ceilings of of their rooms, where from year to year it continues to put forth new leaves, new blossoms, and new fragrance, excited alone to life and action, by the stimulus of the surrounding atmosphere.

L. How I wish one such plant adorned our rooms. Would it not be possible to get one here, and by tempering the air in the house so as to be equally warm with that of its native home, make it flourish as well?

E. It might answer in a hot-house, but would not in common rooms, as the temperature could not possibly be retained at the mean point. Many of these plants are so fitted for their own arid fields, that juicy as they are, it is impossible to make them grow in any but sear and parched soils, and the moisture in our air would most certainly destroy them.

An instance is related of the Solandra, a Jamaica shrub, which was long propagated in stoves by cuttings, and though freely watered, would not show any sign of flowering, notwithstanding the cuttings grew several feet in length every season. By accident, a pot with young cuttings, was mislaid and forgotten in the Kew Garden, and had no water given it, it was thereby reduced to its healthy aridity, and every extremity produced a flower.

There is another plant belonging to the same place, the Brosimum, whose powers of enduring heat and dryness are still more extraordinary. When the grass dies and the soil cracks into chasms, and is baked into brick by that sun whose face is never obscured by a single cloud, it is then Nature comes to the aid of the sear and parched earth by giving this plant, whose leaves, as a writer remarked, have the property to multiply under the flowers of the sky, as others have to grow in the dew. The more burning the sky, and the more arid the earth, the more vigorously its leaves unfold. Under its abundant foliage, both man and cattle find shade and food; its grateful fruit gratifying the one, and its healthful pasturage supplying the other.

L. I have heard it remarked, that in temperate climate the leaves of trees are apart from each other and light, so as to allow the sun to shine on the flowers and trunk, but under a torrid zone they are broad, thick, and firm, serv ing alike to shelter their own flowers and trunk, as well as travellers and animals.

E. As you advance towards the poles the leaves diminish most remarkably in size, dwindling down to an exceeding minuteness, while in the torrid zone, flourishes the Talipot of Ceylon, a single leaf of which is sufficiently large to shelter twenty men from the changes of the climate in which they dwell.

Another remarkable peculiarity, in which plants resemble animals, is their clothing. In cold climates the trees have a warm and thick covering of fine moss, as the bear has of fine fur; in warm ones, on the contrary, both trees, men, and animals are naked.

L. I should think also, that in places exposed to great winds they would have roots sunk very deeply in the earth to prevent their being torn up.

E. Nature is always careful to adapt her children to the dangers that surround them, and invariably suits their abilities to their circumstances. The Reed has flexibility and bends to the blast, the Oak, vigor and bravely withstands it. A botanist can divine at a glance the country of a vegetable that is placed before him. He observes its structure and then considers the climate, or locality to which that structure is fitted.

The Heath that grows on the stormy Cape of Good Hope, has as much elastic power in its stem as if it were made of spring steel, and so energetic are the vital powers of the plants in general of that place, that Thunberg, having carefully taken one up and laid it on a stone, found it after three years in vigorous health and vegetating, having gained some inches, deriving its aliment alone from the moisture and coolness of the stone.

L. If every thing in nature is wisely provided, and has its uses, I should like to know of what possible benefit to man are poisonous plants?

E. They may be of great benefit to him indirectly, by feeding the animals, as I formerly mentioned, which he eats; you must remember that what are poisonous to him are not so in all cases, to other animals.

But more than this, some writers ascribe to them another very important use, that of purifying the atmosphere from unhealthy miasms. We find the greatest number of those plants always in unheathy natural situations, as on the borders of marshes; and as they abound most during the greatest heats, it has been surmised that Nature placed them there to absorb the poison as it rose. Near Rome are some plains over which, at certain seasons of the year, it is death merely to cross, yet all this time they are covered with the balmiest flowers which scent the gales that pass over them, with the most odorous perfumes. Wherever corruption reigns, says a writer, Nature begins to put forth a vigorous vegetation, and scatters flowers to conceal or neutralize it; and to create vast numbers of noxious insects and animals, probably by absorbing the miasma, to restore the air to purity.

L. Yet I often see Stramonium plants growing in considerable quantities, especially on Manhattan Island, in the upper part of the city, where there are no marshes and it is quite healthy.

E. Instead of disproving what I have said, the Stramonium will confirm it; the greater part of the ground on which you see it, is of a marshy nature, but a few years since and the greater part of that portion of the city was covered with water, and has since been filled in with earth, and the Sound channel made narrower. The Stramoniums, on the principle which I have stated among their other uses, tend to make the place more salubrious.

Another point worth attending to in the consideration of poisonous plants, is the fact that they grow in places remote from man, in unenclosed fields and marshy swamps, and that too, generally in formidable singleness; while those necessary to man, grow in families, and near him, as potatoes, palms, bananas, and the different sorts of grain; all of these last covering entire fields with their harvests.

L. The editor of ANIMATED NATURE ILLUSTRATED, makes a similar remark in relation to animals, observing that all destined to serve his uses and pleasures, are gregarious, or are found in great numbers around him, as the common fowls, horses, sheep, goats, and rabbits; while the destructive animals, as the lion, tiger, leopard, and eagle, live far from him, and have no fellowship even with their own kinds, so that they are few and far between.

E. To confirm the views we have considered, it is noted as a remarkable fact, that in cold climates, are neither poisonous plants nor venomous animals. Remove them to the north and they will either die or lose their noxious qualities. Haller remarks, that the Aconite, a deadly poison with us, and with the juice of which the Gauls bathed the points of their arrows to render the most trifling wound inevitably fatal, loses its envenomed properties as it grows further north and is even eaten in Sweden as a salad to create appetite.

By examining carefully we can always find either a means of cure or prevention on the spot where disorder exists. Acting on this principle a gentleman who had observed great numbers of Willow trees growing by a marshy brook, from which the miasm that produced fever and ague was noted for its injurious effects, thought that in the willow must exist a curative principle. After a serious of experiments he found he was right in his conjecture. Since then a salt has been extracted from the tree called *Salacine*, which will eventually supercede the Quinine or active principle of the Peruvian bark.

E. Somewhat similarly, it is related that an Indian of Peru who labored under an intermittent fever, was compelled one day, by excessive thirst, to drink of a pool of water he happened to meet with in the fields. Though the liquor was extremely bitter, the draught was copious, and to his surprise the disease returned no more. Others affected with agues, after hearing his experience, tried the same remedy and experienced similar benefit.

At first it was imagined that the salutary virtue was dependant upon something adherent in the water, but this was found to be a mistake, and it was at length discovered that both the bitter taste and medicinal efficacy arose from a large quantity of the bark of a neighboring tree that had fallen into, and was infused in the pool. The tree was the celebrated Cinchona. By an easy analogy the bark itself came to be employed, and the fever curing virtues of the remedy were soon rendered known to the inhabitants of America.

After the subjugation of Peru, the efficacy of the medicine was carefully concealed from the Spaniards; but was at last, in an hour of need, revealed to the Governor of Loxa by an Indian, in gratitude for a signal obligation formerly conferred. Another opportunity was not long wanting of trying its effect on an European constitution. The subject of experiment was of high rank, being the wife of the viceroy of Peru. Her disease was an ague under which she had nearly sunk, till the Governor of Loxa hearing of her danger, sent her a quantity of the new remedy by which she was speedily cured. The countess name was Chincon, from which the bark has derived its technical appellation.

TWELTH CONVERSATION.

L. I have been thinking that as the grass tribes are mostly annuals and require seed every year to keep their species in existence, they must gradually diminish, for the cattle undoubtedly eat up the plants, seeds and all, and there will come a time when the whole will be consumed and we shall have no more meat on account of the want of grass to feed the animals whose flesh furnish it to us.

E. Instead of calculating how soon such destitution would take place you would, if a true naturalist, look for some contrivance of Providence to avert such a dreadful evil.

Part of your statement was incorrect, you took it for granted without much, if any, examination. The cattle do not eat up the whole plant, watch them and you will observe that they turn aside the fruitful stalk and select the green blade. This arrangement uniformly prevails on plains and valleys.

But in mountainous districts, where the chill temperature is not sufficient to ripen the seeds, the principal grasses that abound in such places are those that increase by the spreading roots, and are in a measure independent of seed.

L. There is however one thing I cannot possibly see the use of, and that is the bitter herbs we so generally see in fields, growing among the grass. I feel so sorry for the poor cattle which must necessarily bite them, that I often tear them up as I pass along.

E. If some well-meaning, though ignorant person, should go down into the kitchen and after looking around collect all the Sage, Thyme, Mustard, Onions, and salt that could be found, and throw them away for the purpose of obliging you, thinking all the while how grateful you ought to be for being relieved of eating such disagreeable tasting things, what would you say?

L. That before intruding on another's premises, and meddling with their things, the person should endeavor to acquire as much information as possible, for without that a great amount of responsibility would be incurred without doing any possible good. Yet I cannot conceive of a case in which people could be so ignorant as to throw away the seasoning of food for such a silly reason.

E. Yet, on precisely the same grounds, you entered the premises of the cattle and plucked up what answered the same purpose to them as salt and kitchen herbs did to you. You must remember that God takes care of the happiness of every living creature, and that a work of superogation of his has never been discovered.

But it is time now to close our preliminary conversation, you know quite enough to commence botanising without farther delay. There is one thing you must invariably, when possible, do and that is not only to collect a specimen of each plant for examination but one or two for preservation. Taking some pains to adhere to this rule will ensure you in a short time a valuable Herbarium.

L. How shall I preserve the plants?

E. When you want them for analysis a tin box, with a tightly fitting lid, is the best; they will keep for a number of days in this way by occasionally sprinkling water upon them. You can use the box I employ, for this purpose, and it will be seldom empty if you continue studying botany as you have commenced. Do not forget that three hundred specimens carefully analysed will rank you among the order of botanists.

For your herbarium, a different course must be pursued: provide yourself with as many old newspapers as you can, file them, and between their leaves, some pages intervening for each plant, place your specimens; over the top of all lay your largest atlas, covered with enough books to make it quite heavy. The paper will absorb the mixture; taking them out often, and exposing both paper and plants to a current of air, will materially help the drying. You can easily tell when this is accomplished, and must then transfer them to your blank-book. Write on each page with the flower, the class, order, genus, and specific name, and the place where you found it, or the name of the person, if a present, as well as the location. It will be well to have a regular description on one side of the page, and the flower on the other.

L. How long does it take them to dry?

E. From a couple of days to two or three weeks, depending of course on the moisture they contain.

L. How should they be fastened on?

E. Sewing with a fine needle and thread is perhaps the best plan. Some cut the paper itself and thus form loops, others use glue and paste. To defend the whole against insects, it is well to pass a brush over it dipped in an alcoholic solution of corrosive sublimate.

L. I noticed in your herbarium that many of the prettiest flowers had lost their color and changed to black. Is it so always?

E. Often among the blue, red, and white colors; yellow, scarlet, and green, are rather more durable. To give you an opportpnity of applying your knowledge, I will pluck this flower and wish you to discover its name by its characters. Dr. Thornton, compares a person engaged in ascertaining the name of a plant to one upon a botanical journey, the plant being his directory. If he can read the botanical characters impressed upon it by the hand of nature, he will, by following the system, soon arrive at his journey's end. How many stamens do you here count?

L. Five. It is in the fifth class, and as there is but one pistil, in the first order.

E. We will suppose the directory points to New York State by the class, and to New York City by the orders. We will next find the street and house, which we can do by the corresponding generic and specific marks.

L. Why this must be exactly the plan pursued at the Post Office, in sending off letters that are directed to different persons.

E. It is. Now having found the class and order, let us turn to the list of genera in the first order of the fifth class. You will find such a list in any of the larger systematic works on botany.

L. It compares best with the Mirabilis or Marvel of Peru; the corona is funnel formed, narrow below, the calyx inferior, and it has a globular stigma.

E. You are right. Turn now to the genus Mirabilis, and see with which of its species it agrees.

L. Mirabilis Dichotoma—Mexican Four O'Clock; flowers sessile, axillary, erect, solitary. It cannot belong to Mexico then. Now for another, the Mirabilis Jalapa — Common Four O'clock, flowers heaped, peduncled, leaves glabrous. I must look in the GLOSSARY for the meaning of some of these terms. Yes; this is the flower. I need proceed no further.

E. The generic marks led you to the house, and the specific to the number, so that your journey has ended, the letter has at last reached its destination. Here is another plant, in what class and order is it?

L. I must cut it open to see. It is in the fourth class and first order, it has four stamens and one style.

E. Will you turn to that class and order in the manuscript and tell the genus. You will have easy work, for they are comparatively few in the class.

L. I am unsuccessful. I have compared it with all species and it does not agree with a single description. There is a mistake somewhere; perhaps it has been omitted by accident in the list.

E. Can plants having only four stamens be possibly in any other class but the fourth?

L. They cannot. O yes! I recollect, two of the stamens are longer than the others; it must belong to the class of two powers—Didynamia. It has a calyx with one of the teeth truncate: corol funnel-shaped and curved tube, the border five cleft nearly equal. It must be the Verbena.

E. I purposely selected that flower to puzzle you. I did so, because, when a school girl, I was caught in that way myself, and the effect on my mind was invaluable; though often exposed, I never failed afterwards, and I have no doubt it will be equally serviceable to you.

L. I hope I will examine more carefully before I give another opinion; but I have not yet found its species. It is the Verbena Hastata, I can tell it at the first glance looking among the species. It is erect and high with long narrow leaves, awl pointed at the ends, and roughly sawed on the margin. The lower leaves somewhat gash-hastate, spikes linear and panicled, with an appearance of piling.

E. You can now pursue your journey in a great measure alone. With a far less amount of knowledge to commence, many, by unassisted effort, have become celebrated naturalists. Here is another flower that grows very plentifully in grandmother's garden, and which she says often fall down by its own weight. Take a blossom and tell me its name.

L. It has ten stamens and two pistils; it is then in the tenth class and second order of that class.

E. How will you write it in your description?

L. Class Decandria, order, Digynia. Its calyx is inferior or below the germ, made of one leaf, tube-shaped, has five teeth, and, let me see, destitute of scales. The petals are five in number, with claws. It must belong then to the genus Saponaria, and turning to that genus in the Botany, I perceive it agrees with the description of the Officinalis. The calyx is cylindrical, the leaves of a long oval shape, opposite to each other, and nearly growing together around the stem. This is the Soapwort, or what grandmother calls Bouncing Bet. I perceive, that in looking up the genus of a plant, my attention must be principally directed to the parts of the flower, while the specific differences relate the stems and leaves.

E. There is a distinction between the stems of plants which is based on their modes of growing. The two kinds are called by the names of ENDOGENOUS and EXOGENOUS.

L. What do the names mean?

E. Endogenous means, literally, an *inside grower;* exogenous an *outside grower.* Endogenous plants are also *Monocotyledonous;* exogenous plants, *Dicotyledonous.*

The Cocoa-nuts, Date Palm, Sugar Cane, and most of the trees of tropical climates are endogenous. They have long stems of the same thickness from top to bottom, the leaves in the form of a Cabbage, being situated at the top. The woody matter is deposited in the stems in the centre at first, and as it is continually forming, pushes out the old matter to the circumference, and does this until the bundles of wood at the outside become so closely wedged together and tight, that it is impossible to increase its diameter. Another layer is then added upwards. Such trees have no real bark, the rough appearance of the outside being merely the remains of leaves.

L. The trunks of such trees then, while growing, look like stumps of our trees when cut down and sawed smooth, only covered on the top with leaves. There are few of these curious plants with us.

E. None that attain the size of trees. You perceive now why they are termed endogenous, as they grow from the centre outwards. When a European wood cutter, it has been well remarked, begins to fell a tree of this description, he is quite astonished at his hardness. 'If I have so much difficulty with the outside,' says he, 'how shall I ever get through the heart of the wood?' But as he proceeds, he finds that the trees of the tropical climates have tender hearts though hard surfaces. It is said that this renders them peculiarly appropriate for making masts of vessels and pipes to convey water.

Exogenous trees toper from the bottom to the top, and send off branches on all sides, which the endogenous rarely do; they more or less, in all cases, resemble a cone in shape. The stem is composed of the wood and bark. In the centre is the pith which answers somewhat like the marrow that is in our bones for the purpose of nourishing them. This pith or cellular substance is in both endogenous and exogenous stems; in the former it forms with the woody matter irregular bundles, but has in the latter a radiated appearance, distinguishing the different kinds at first sight.

L. I should think that was hardly needed as a distinguishing mark. We can tell endogenous trees by not giving off branches and the bundle of leaves at the tops.

E. There is another external mark, the veins in the leaves, or woody lines run parallel to each other, and are generally long and pointed; while in the exogenous plants they form an intersecting net work.

The first year there is a layer of woody matter around the pith between it and the bark; during cold weather vegetation ceases. The second year there is another layer added outside the first layer and inside the bark; this last squeezes the first so tightly that it cannot expand at all sideways, and as it continues growing must shoot upward. The third year another layer encloses the second, and serves it as it has served the first, so that the second is forced upwards in same manner. In three years then, there are three layers, the first of which is highest, the second next in height and the third lowest, thus explaining it conical form.

L. If we could see the different layers of wood I think we might easily tell the age of the tree.

E. They are generally very easily distinguishable. Here is a piece of fire wood; how old is it?

L. There are twenty-two rings, it is twenty-two years old.

E. Examine the other end; how many rings in that?

L. Twelve.

E. Twelve from twenty-two, leaves ten; it was, consequently, ten years growing the length of this piece.

L. But does it ever stop growing?

E. Yes; for at last the inside layers become so extremely hard as to be no longer capable of yielding to pressure, it is then *perfect wood*, before which it was *alburnum* or white wood, so called from its color.

L. But that could not apply to the Mahogany tree whose wood is not white.

L. It does, however, apply in every case; not until it becomes *perfect wood*, and ceases to be *alburnum*, does the deposit of coloring matter take place in it which gives each kind its peculiar character; even ebony when young is perfectly white.

L. But how does the bark grow all this time?

E. In an endogenous manner. The layers are added from the inside, and push the former matter out, so that it cracks and breaks in every direction, causing that roughened appearance we see in the Oak and Elm.

The bark of some trees is so hard and inflexible that it will not yield, but splits and breaks off every season; such is the Plane tree. On the other extreme, is the Cork tree, whose bark does not harden for a number of years, and being stripped off while soft answers a variety of purposes in the arts.

If you take a gimblet and bore through the bark till you just reach the alburnum, as the successive coats of bark are deposited internally, and push the others out, the gimblet will, after a while, drop to the ground. In this way inscriptions on the bark of trees are effaced by the distension and consequent cracking.

L. But if the gimblet enters the alburnum some distance, it will not drop off, but be held tighter every year.

E. Even an inscription made deep enough to penetrate the alburnum will remain uninjured. A story is told of the great traveller Adamson finding a treasure in this way. He relates that in visiting Cape Verd in the year 1748, he was struck by the venerable appearance of a tree 50 feet in circumference. He recollected having read in some old voyages an account of an inscription made in a tree thus situated. No traces of such an inscription remained, but the position of the tree having been accurately described, Adamson was induced to search for it by cutting into the tree, when to his great satisfaction, he discovered the inscription entire, under no less a covering than three hundred layers of wood.

A somewhat similar story is related of Daniel Boone, the first settler of Kentucky.

SYNOPSIS.

CLASSES.	ORDERS.
1. MONANDRIA. Ginger, Arrow-root, and Canna.	1. Monogynia, 2. Digynia.
2. DIANDRIA. Jessamine, Privet, Olive, and Lilac.	1. Monogynia, 2.Digynia.
3. TRIANDRIA. Saffron, Iris, and the Grasses.	1. Monogynia, 2. Dygynia, 3. Trigynia.
4. TETRANDRIA. Bed Straw, Holly, and Skunk Cabbage.	1. Monogynia, 2. Digynia, 3 Trigynia, 4. Tetragynia.
5. PENTANDRIA. Forget Me Not, Borage, Bind, weed, Potatoes, Bell Flowers and Violets.	1. Monogynia, 2. Digynia, 3. Trigynia, 4. Tetragynia, 5. Pentagynia, 6. Hexagynia, 13. Polygnia.
6. HEXANDRIA. Snow Drop, Narcissus, Tulip, Aloe, Grape, and Hyacinth.	1. Monogynia, 2. Digynia, 3. Trigynia, 4. Tetragynia, 6. Hexagynia, 13. Polygynia.
7. HEPTANDRIA. Horse Chestnut, and Chick Wintergreen.	1. Monogynia, 2. Digynia, 4. Tetragynia, 6. Hexagynia.
8. OCTANDRIA. Ear Drop, Cranberry, and Tree Primrose.	1. Monogynia, 2. Digynia, 3. Trigynia, 4. Tetragynia.
9. ENNEANDRIA. Rhubarb, Sassafrass.	1. Monogynia, 2. Digynia, 3. Trigynia 4. Tetragynia.
10. DECANDRIA. Cassia, Wild Indigo, Arbutus, Venus Fly-trap, Hydrangea Pinks, and, Pokeweed.	1. Monogynia, 2. Digynia, 3. Trigynia, 4. Tetragynia, 5. Pentagynia, 10. Decagynia.

Rejected. 11. DODECANDRIA. Agrimony and Mignonette	1. Monogynia, 2. Digynia, 3. Trigynia, 5. Pentagynia, 12. Dodecagynia.
12. ICOSANDRIA. Peach, Apple, Rose, Cactus, Ice Plant, Plum, and Strawberry.	1. Monogynia, 2. Digynia, 3. Trigynia, 5. Pentagynia, 13. Polygynia.
13. POLYANDRIA. Poppy, Larkspur, Columbine, Tea, Water Lily, Lemon, and Peony.	1. Monogynia, 2. Digynia, 3. Trigynia, 4. Tetragynia, 5. Pentagynia, 6. Hexagynia, 13. Polygynia.
14. DIDYNAMIA. Mint, Pennyroyal, Catnep, and Vervain.	1. Gymnospermia, 2. Angiospermia.
15. TETRADYNAMIA. Horse Radish. Mustard, and Cabbage.	1. Siliculosa, 2. Siliquosa.
16. MONADELPHIA. Geranium, Passion Flower, Hollyhock, Cotton.	3. Triandria, 5. Pentandria, 7. Heptandria, 8 Octandria, 9. Enneandria, 10. Decandria, 12. Dodecandria, 13. Polyandria.
17. DIADELPHIA. Pea, Bean, Lucerne, Indigo, and Liquorice.	5. Pentandria, 6. Hexandria, 10. Octandrie, Decandria.
Rejected, 18. POLYADELPHIA. Chocolate, and St. John's Wort.	5. Pentandria, Icosandria, Polyandria.
19. SYNGENESIA. Dandelion, Lettuce, Burdock, Thistle and all the other compound flowers.	1. Polygamia Equalis, 2. Polygamia Superflua, 3. Polygamia Frustranea, 5. Polygamia Nescessaria, 5. Polygamia Segregata.
20. GYNANDRIA. Orchis, Lady's Slipper, Vanilla, Birthworth, and the Silk Weeds.	1. Monandria, 2. Diandria 4. Tetrandria, 5. Pentandria, 6. Hexandria, 10. Decandria, 12. Dodecandria, 13. Polyandria.

nose. Stem panicled. Calyx ovate, mucronate. Scales broad, lanceolate close pressed; woolly margin. [Canada Thistle.]

DATURA.—Pentandria Monogynia. Calyx tubular, angled, caducous, with a round permanent base. Corol funnel form, plaited. Capsule four valved. Thorny.

D. Stramonium. Pericarps spinose, erect ovate. Leaves ovate with angular teeth. [Thorn Apple.]

DIANTHUS.—Decandria Digynia. Calyx inferior, cylindric, one leaved, with four scales commonly at base, sometimes eight. Petals five, with claws. Capsules cylindric, one celled.

D. Barbatus. Flowers fascicled. Scales of the calyx ovate, subulate. Leaves lanceolate. [Sweet William.]

D. Caryophyllus. Flowers solitary. Calcynine scales cylindric, very short. Petals crenate. Leaves linear subulate, channelled. [Carnation.]

D. Chinensis. Flowers solitary. Scales of calyx subulate, spreading, leafy, equalling the tube. Petals crenate, leaves lanceolate. [China Pink.]

ERODIUM.—Monadelphia Pentandria. Calyx five leaved. Corol five petalled. Nectaries five, alternating with filaments. Arils five, one seeded, awned, beaked at base of receptacle.

E. Ciconium. Penduncle sustaining many flowers. Leaves pinnate; leaflets toothed pinnatifid. Petals oblong, obtuse. Stem ascending. [Storksbill Geranium.]

E. Cicutarium. Penduncle sustaining many flowers. Leaves pinnate, leaflets sessile, pinnatifid, gashed. Corol much larger than Calyx. Stem prostrate, hirsute. [Hemlock Geranium.]

E. Moschatum. Peduncle sustaining many flowers. Leaves pinnate, leaflets partially provided with stalks, oblong toothed, coral equaling the calyx, stem procumbent. [Musk Geranium.]

FRAGARIA.—Icosandria, Polygynia. Calyx inferior ten cleft, the five alternate divisions being smaller. Petals five. Receptacle ovate, simulating a berry. Acines naked, immersed in the receptacle.

F. Virginiana. Calyx of the fruit spreading. Hair on the petioles erect on the peduncles close pressed. Leaves rather glabrous above. [Wild Strawberry.]

F. Vesca. Calyx of fruit reflexed. Hair on the petioles spreading, on the penduncles close pressed. [English Strawberry.]

GERANIUM.—Monadelphia Decandria. Calyx five leaved. Corol five petalled regular. Nectaries five, adhering to the base of the five alternating long filaments. Arils five, one seeded awned, beaked at the elongated top of the receptacle.

G. Maculatum. Erect. Stem dichomatous. Leaves opposite, three or five parted, gashed, upper leaves sessile. Penduncles two flowered. Petals obovate. [Spotted Geranium.]

G. Robertianum. Spreading, hirsute. Leaves opposite, ternate and quinate, three cleft, pinnatifid. Penduncles two flowered. Petals entire, twice as long as Calyx. Awn net veined. [Herb Robert.]

HELIANTHUS.—Syngenesia Polygamia Frustranea. Calyx imbricate sub-squarrose, leafy. Receptacle flat, chaffy. Egret two leaved chaff-like caducous.

H. Annuus. Leaves cordate, three nerved.

Penduncles thickening upwards. Flowers nodding. [Common Sunflower.]

H. Tuberosus. Leaves three nerved, scabrous; lower ones ovate, upper ones ovate acuminate. Petioles ciliate. Root tuberous. [Jerusalem Artichoke.]

IRIS.—Triandria Monogynia. Corol six petalled, unequal. Petals alternate jointed and spreading. Stigmas three, petal form, cowled, two lipped.

I. Plicata. Bearded. Scape mostly one flowered, and as long as the leaves. Petals, undulate, plicate, erect ones broadest. [Garden Iris.]

I. Germanica. Corolla bearded. Stem with leaves, many flowered. Inferior flowers peduncled. [Fleur de Lis.]

IPOMEA.—Pentandria Monogynia. Calyx five cleft, naked. Coral funnel form with five folds. Stigma globular, and covered with fleshy points. Capsule two or three celled, many seeded.

I. Coccinea. Pubescent. Leaves cordate, acuminate. Peduncles five, flowered. Corolla tubular. [Scarlet Morning Glory.]

I. Quamoclit. Leaves pinnatifid linear. Flowers solitary. Corolla tubular. [Crimson Cypress Vine. Jasmine Bindweed.]

JASMINUM.—Diandria Monogynia. Corol salver shaped. Berry two seeded. Seeds solitary arilled.

J. Officinale. Leaves opposite, pinnate, leaflets acuminate. Buds almost upright. [Jasmine.]

KALMIA.—Decandria Monogynia. Calyx five parted. Corol wheel-salver-form, with ten horns beneath and ten cavities within, which contain the anthers until the pollen is mature. Capsule, five celled, many seeded.

K. Latifolia. Leaves long petioled, scattered, in threes, oval, smooth. Corymbs terminal, with visced hairs. [Mountain Laurel.]

K. Glauca. Brachlets double edged. Leaves opposite, subsessilo, oblong, smooth, margin revolute, glaucous beneath. Corymbs terminal, bracted. Penduncles and calyxes glabrous. [Swamp Laurel.]

LILIUM.—Hexandria Monogynia. Corol inferior, six petalled, bell shaped. Petals with a longitudinal line from the middle to the vase. Stamens shorter than the style. Capsules with valves connected by cancellated hair.

L. Candidum. Leaves lanceolate, scattered. Corolla bell shaped, smooth within. [White Lily.]

L. Philadelphicum. Leaves whorled, lance linear. Corol erect, bell-form spreading. Petals lanceolate with claws. [Red Lily.]

L. Canadense. Leaves remotely whorled, lanceolate. Peduncles terminal, lengthened, often in threes. Corol nodding. Petals spreading. [Nodding Lily.]

Lonicera.—Pentandria Monogynia. Calyx, five toothed. Corol tubular, long, five cleft, unequal. Stamens exsert. Stigmas globose. Berry, two or three celled, with many seeds.

L. Caprifolium. Cowls gaping, terminal. Leaves sessile, connate. [Honeysuckle.]

L. Periclymenum. Flowers in piled, terminal heads. Leaves distinct. [Woodbine.]

Myosotis.—Pentandria Monogynia. Calyx mostly five cleft. Corol, salver form, carved, five cleft, lobes slightly emarginate, throat closed with convex scales. Seeds mostly smooth.

M. Palustrus. Seeds smooth. Calyx, leaves nearly oval, as long as the tubes of the corol. Stem sub-ramose. Leaves, lance-oval. Racemes bractless. [Forget Me Not.]

M. Arvensis. Calyx leaves oval, acuminate, hirsute, longer than tube of corol. Stem branching. Racemes conjugate. Leaves lance-oblong, hirsute. [Scorpion Grass.]

NYMPHEA.—Polyandria Monogynia. Calyx four, six and seven leaved. Corol, many petalled, petals equalling the length of sepals. Stigma a broad, disk marked with radiated lines. Berry, many celled, many seeded.

N. Odorata. Leaves round-cordate, entire, sub-emarginate, lobes spreading asunder, acuminate, obtuse. Petals equalling the four leaved Calyx. [Sweet Scented Water Lily.

OXALIS.—Decandria Pentagynia. Calyx five parted, permanent. Petals, five, often connected at the base. Capsules, five celled, five cornered, opening at the corners. Seeds arilled.

O. Acetosella. Scape one flowered. Styles equal. Leaves ternate, obcordate, hirsute. Root toothed. [Wood Sorrel.

Papaver.—Polyandria, Monogynia. Calyx, two-leaved, caducous. Corol, four petalled. Stigma, a disk with radiating lines over it. Capsules one celled, opening dehisent by holes under the permanent stigmas.

P. Rheas. Capsules, urn shaped, smooth. Stem, many flowered, pilose. Leaves, gash-pinnatifid. [Wild Poppy.]

Quercus.—Monœcia Polyandria. Staminate flowers.—Calyx, commonly five, cleft. Corolla, none. Stamens, five or ten. Female: Calyx, one leaved, quite entire rugged. Corolla, none. Styles, two to five. Seeds one, ovate.

Q. Tinctoria. Leaves obovate, oblong, pubescent beneath; lobes oblong, obtuse, denticulate, setaceous mucronate. Calyx, saucer form. Acorn, depressed, globose. [Black Oak.]

Rubus.—Icosandria Polygynia. Calyx, five cleft, inferior. Corol, five petaled. Berry, composed of one seeded juicy, acini.

R. Ideus. Leaves quinate, pinnate and ternate, tomentose underneath, leaflets rhomb-ovate, acuminate. Petioles channelled. Stem prickly. [Raspberry.]

R. Villosus. Pubescent, hispid and prickly. Leaves digitate in threes or fives, leaflets ovate, acuminate, serrate and hairy both sides. Stem and petioles prickly. Calyx, short, acuminate. Petals lance ovate.

SALVIA.—Diandria Monogynia. Calyx tubular, striated, two lipped. Cowl ringent. Filaments fastened transversely to a pedicel.

S. Officinalis. Leaves, lanceolate, ovate notched. Flowers spiked. Calyx mucronate. [Sage.]

THYMUS.—Didynamia Gymnospermia. Calyx, sub campanulate. Throat closed with villose hairs. Corol of the upper lip shorter.

T. Vulgaris. Stems erect. Leaves, ovate, revolute. Flowers whorl spiked. [Thyme.]

ULMUS.—Pentandria Digynia. Calyx somewhat bell form, generally five cleft, inferior, permanent. Corolla none. Capsules membranaceous, flat, compressed, one seeded.

U. Americana. Branches smooth. Leaves oblique at base, serratures acuminate. Flowers pedicelled. Fruit fringed with dense down. [Elm Tree.]

VERONICA.—Diandria Monogynia. Calyx four parted. Corol four cleft, wheel shaped, with the lowest segment narrower. Capsule two celled, few seeded.

V. Officinalis. Spikes lateral, peduncled. Leaves opposite, obovate, hairy. Stem procumbent, with coarse hairs. [Speedwell.]

WINDSORIA.—Triandria Digynia. Calyx, two valved, one nerved, cuspidate. Corols two valved, outer valves having nerves with mucronate points, between which are teeth and a fringing below; inner valves naked. Flowers closely piled two ways in a thick spike.

W. Seslerioides. Panicle spreading and flexuose. Spikelets peduncled, generally six flowered, lanceolate. Lower valve of corol ovate five toothed. [Red-top.]

XANTHIUM.—Monœcia Pentandria, Male: Calyx common, imbricate. Corol one petalled, five cleft, funnel form. Receptacles chaffy. Female: Involucre, two leaved. Corol none, Drupe dry, muricated, two cleft. Nut two celled.

X. Strumarium. Stem unarmed. Leaves cordate, serrate, three nered at the base. Fruit, oval, pubescent, with hooked bristles. [Bur Weed.]

YUCCA.—Hexandria Monogynia. Corol, inferior, bell form. Filaments sub-clavate. Style, none. Capsule oblong, with three obtuse angles, three celled opening at the summit. Seeds compressed.

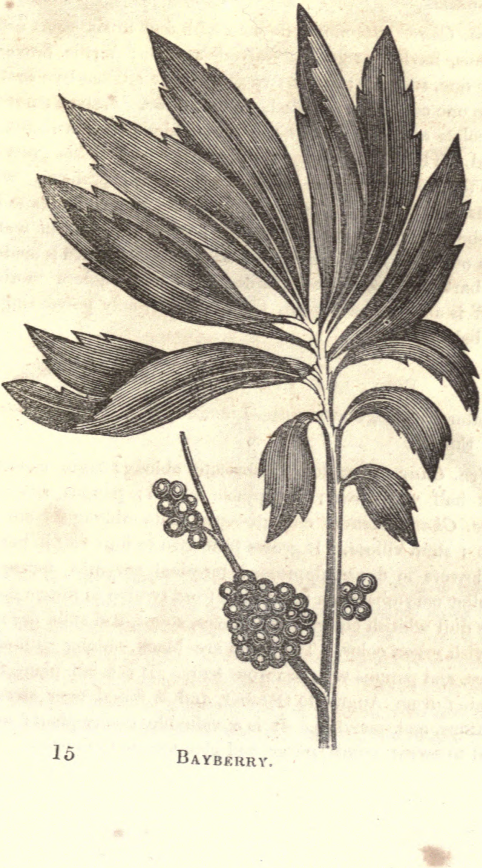
Y. Filamentosa. Stemless. Leaves broad, lanceolate entire, filamentose in the margin. Stigmas turned back, spreading. [Silk Grass. Bear Grass.]

ZEA.—Monœcia Triandria. Male: Calyx, glume, two flowered, awnless, corol glume, awnless. Female: Calyx glume, two valved. Style one, long and pendulous. Seed solitary, buried in an oblong receptacle.

[In examining this genus it should be remembered that the number of valves are increased in the glumes by cultivation.]

Z. Mays. Leaves lance linear, entire keeled. [Indian Corn.]

MEDICAL PLANTS.



15 BAYBERRY.

MYRICA CERIFERA—BAYBERRY.

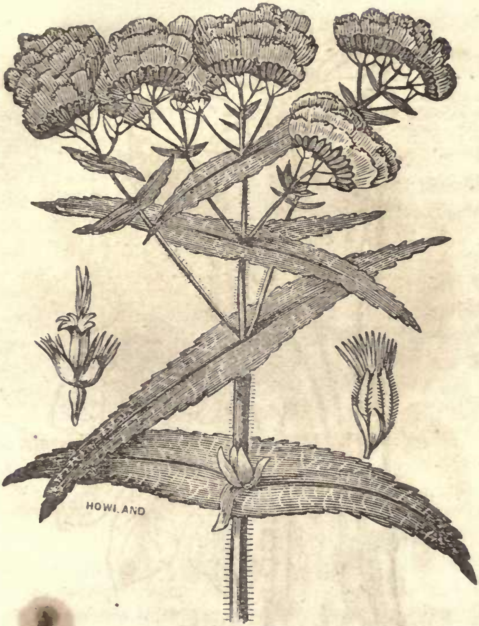
Natural order, Myricaceæ—Linnæan class, Diœcia—Order, Tetrandria.

Gen. Char. Staminate flowers with four to six short erect stamens, having large four-valved anthers; fertile flowers; ovary one, superior; styles two spreading; stigmas two acute; drupe one celled, one seeded. *Spec. Char.* Leaves cuneate, lanceolate acute, sterile ameuts lax; scales acute; fruit round, naked. This plant is found in dry woods and fields, growing from three to six feet in height, and covered profusely with leaves. It blooms in May. The specific name alludes to the wax-bearing property of the fruit, which, boiled in water, gives one third its weight of bayberry tallow. A tea is made of the bark, and used freely in diarrhœa and cholera morbus. Suuff is also prepared from the bark by finely powdering it, and baking.

EUPATORIUM PERFOLIATUM—BONESET.

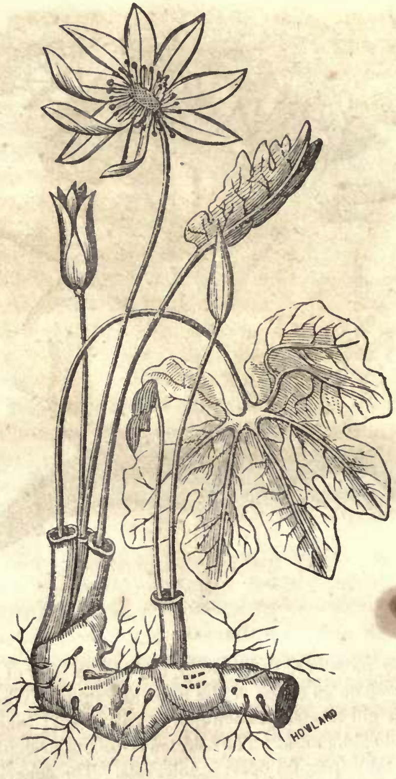
Natural order, Compositæ—Linnæan class, Syngenesia—Order, Equalis.

Gen. Char. Involucre imbricate, oblong; style exserted, cleft half way down; receptacle naked; pappus scabrous. *Spec. Char.* Leaves connate—perfoliate, oblong-serrate, rugose; stem villose. It grows from two to four feet in height. It flowers in dense, depressed, terminal corymbs, formed of smaller corymbs, each containing from twelve to fifteen florets of a dull whitish color. The leaves, stems, and stalk are of a grayish green color. The seeds are black, oblong with acute bases, and pappus with scabrous hairs. It is a fall plant, blossoming from August to October, and is found near streams, swamps, and marshes. It is a valuable family plant; much used to sweat, vomit, purge, and give tone to the system. The



BONESET

dose of the powdered herb is ten grains. A pint of boiling water poured on an ounce of the herb, and strained when cool, is given in gill doses. Taken hot, it will sweat; lukewarm, vomit; and cold, purge. The cold tea is used to strengthen the system, in tablespoonful doses at intervals. The generic name was given in honor of Eupater, king of Pontus, who first used it; the specific, in allusion to the leaf clasping the stem.



Blood-root.

SANGUINARIA CANADENSIS—BLOOD-ROOT.

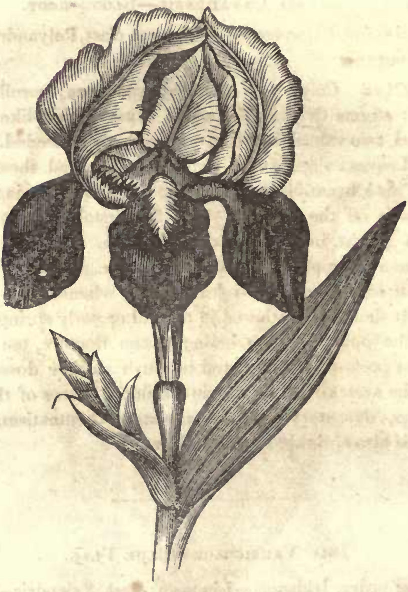
Natural order, Papaveraceæ—Linnæan class, Polyandria—Order, Monogynia

Gen. Char. Calyx two sepalled, caducous; corolla eight petalled; stigma two-lobed, sessile; capsule—pod-like; ovate one celled, two valved, acute at each end, many seeded. *Spec. Char.* Leaves subreniform; scape one-flowered, sheathed at base. This a beautiful little plant, sometimes appearing before the snow is off the ground. The flowerstalk is some eight inches in height, bearing a white, square, scentless flower, which soon disappears. The root is the part used; when pressed, it exudes a blood-colored fluid, whence the generic name. It should be gathered in the fall or early spring. The dose of the powder is one grain; of the tincture, ten drops. It induces profuse sweating, and in much smaller doses gives tone to the system. It is used in chronic diseases of the liver and lungs, dysentery, and inflammatory rheumatism. The powder is also sprinkled on foul ulcers.

IRIS VERSICOLOR—BLUE FLAG.

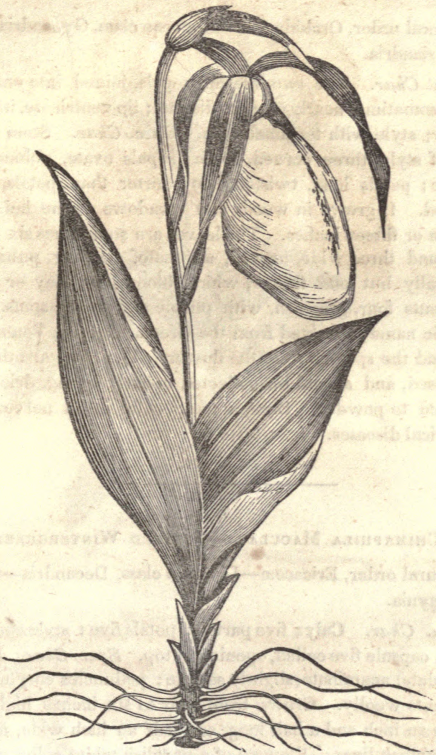
Natural order, Iridaceæ—Linnæan class, Triandria—Order, Monogynia.

Gen. Char. Sepals three, reflexed, larger than petals; stamens distinct; stigmas petaloid, covering the stamens and rarely supported by a style. *Spec. Char.* Stems terete, flexuous; leaves ensiform; flowers beardless; ovary triangular. A very handsome, well-known plant, deriving its generic name from the Greek, meaning rainbow, on account of the beautiful changing tints of the flowers, which are of purple or violet



BLUE FLAG.

colors, and bloom in June. It grows some three feet in height. The root is the portion used; eight grains of the fresh powdered, or fifteen of the dried, will purge. It is given in dropsy, and sometimes in chronic liver complaint. The decoction is also used as a wash in sore mouth and ulcers.



LADIES' SLIPPER.

CYPRIPEDIUM PARVIFLORUM—YELLOW LADIES' SLIPPER.

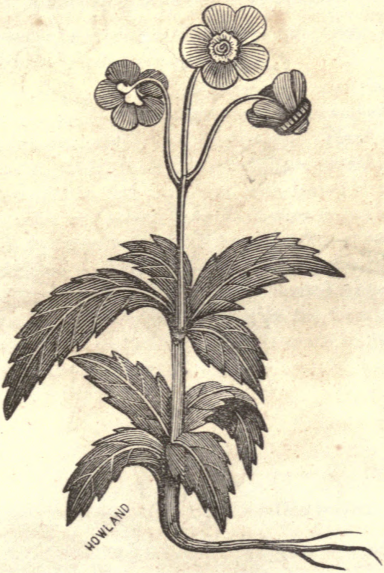
Natural order, Orchidæceæ—Linnæan class, Gynandria—Order, Triandria.

Gen. Char. The two inferior sepals, joined into one segment, sometimes nearly or quite distinct; lip ventricose, inflated, obtuse; style with terminal lobe. *Spec. Char.* Stem leafy; lobe of style, three corned, acute; sepals ovate, oblong, acuminate; petals long, twisted; lip shorter than petals, compressed. It grows in woods and meadows to the height of twelve or fifteen inches. The leaves are sometimes six inches long and three wide, nerved, alternate, clasping pubescent. Generally but one flower, which blooms in May or June. Segments four, greenish, with purple stripes and spots. The generic name is derived from the Greek, meaning Venus' slipper, and the specific from the flower. The roots are the portion used, and should be collected in early spring, dried, and reduced to powder. Dose, a teaspoonful in all nervous and hysterical diseases.

CHIMAPHILA MACULATA—SPOTTED WINTERGREEN.

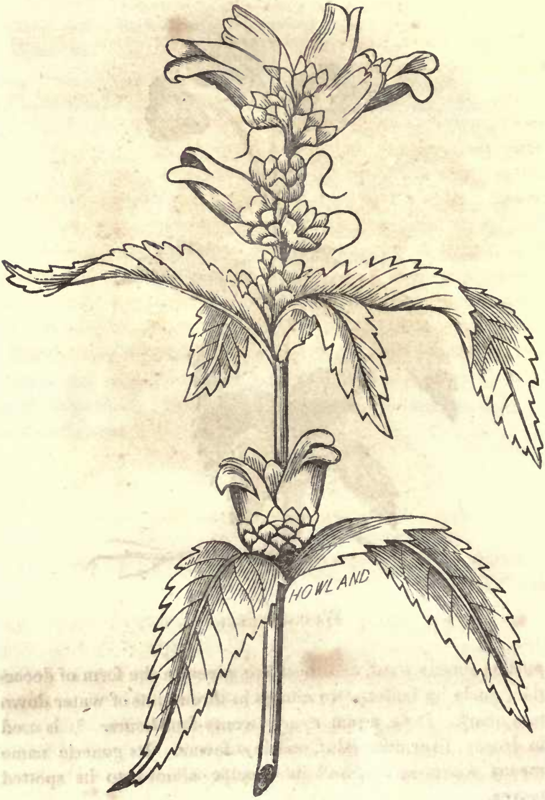
Natural order, Ericaceæ—Linnæan class, Decandria—Order, Monogynia.

Gen. Char. Calyx five parted; petals five; style short and thick; capsule five celled, opening at top. *Spec. Char.* Leaves lanceolate, acuminate, slightly serrate; peduncles corymbosed, filaments woolly. Grows from four to six inches high, with leaves an inch and a half long, and half an inch wide, marked with whitish lines. Flowers of a purplish white color, on nodding stalks, blooming in June and July. The leaves are the



WINTERGREEN.

portion mostly used, and these are given in the form of decoction, made by boiling two ounces in three pints of water down to a quart. Dose, a pint every twenty-four hours. It is used in dropsy, liver complaint, and low fevers. Its generic name means winter-loving, and its specific alludes to its spotted leaves.



SNAKEHEAD.

CHELONE GLABRA—SNAKEHEAD.

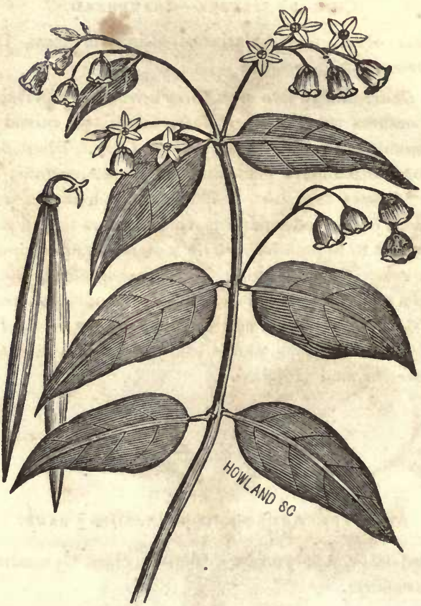
Natural order, Scrophulariaceæ—Linnæan class, Dedynamia—Order, Angrospesmia.

Gen. Char. Calyx five cleft, three bracted; corol ringent, inflated; anthers woolly; capsule two celled, two valved; seeds with membranous margins. *Spec. Char.* Plant smooth; leaves opposite, oblong lanceolate, acuminate, serrate; flowers spiked. Grows two feet in height, with leaves of a shining dark green color, and sends out white flowers tinged with red, from August to September. The generic name supposes the flowers resemble a tortoise, but the common name likens them to a snake with open mouth and extended tongue. The plant has a bitter taste, and is given in the form of tea to strengthen the stomach, and is said to be useful in liver complaint, worms, and jaundice.

APOCYNUM ANDROSEMIFOLIUM—DOG S-BANE.

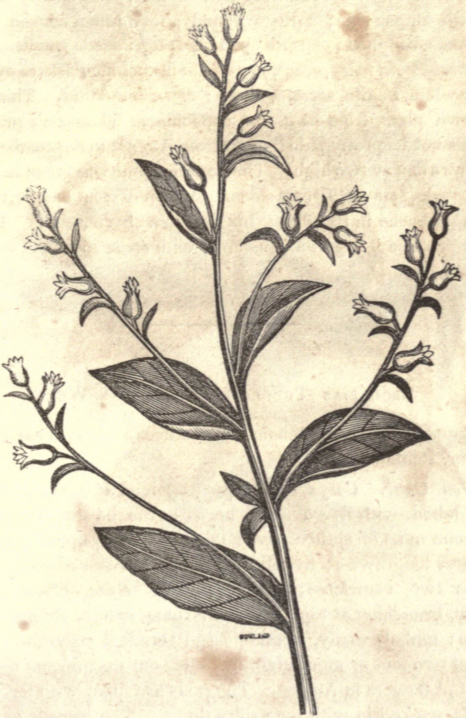
Natural order, Apocynaceæ—Linnæan class, Gynandria—Order, Pentandria.

Gen. Char. Calyx small; corolla bell-shaped, with small lobes; stamens inside; filament short, alternating with five glandular teeth; anthers sagittate, connivent, cohering to stigma by the middle; ovaries two; stigmas connate; follicles long, distinct. *Spec. Char.* Leaves ovate; cymes lateral and terminal; tube of corolla longer than calyx, with limb spreading; a handsome plant, attaining the height of three feet, and, in August, making a fine appearance with its dark green leaves



Dog's Bane.

and red and white-striped flowers. The root is the part used; twenty-five grains of it, when fresh-powdered, act as an emetic. Two or three grains, frequently repeated, are given in dyspepsia and low fevers. The Indians cure dropsy with it by giving large doses. The generic name resembles in meaning the common English one.



LOBELIA INFLATA—INDIAN TOBACCO.

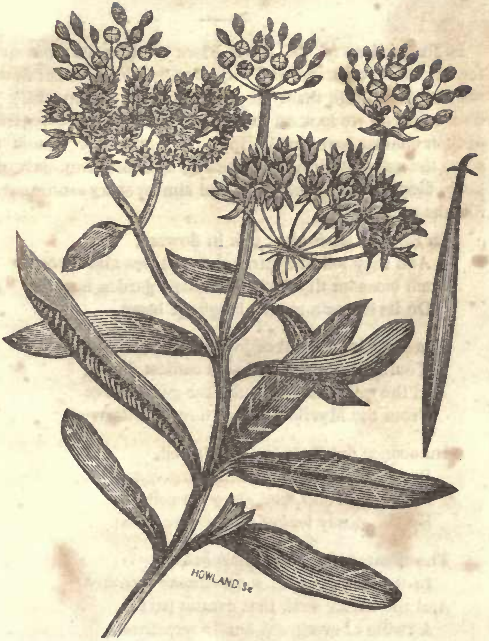
Natural order, Lobeliaceæ—Linnæan class, Pentandria—Order, Monogynia

Gen. Char. Corolla irregular, tubular, cleft nearly to base on the upper side; anthers joined above into a curved tube; stigma two-lobed; capsule opening at top; seeds small. *Spec. Char.* Stem hairy, erect, somewhat branching; leaves ovate—lanceolate, sessile, serrate, pilose; capsule inflated. This well-known plant, from its use as a specific in Thomson's practice, sends out its pretty pale flowers from August to September. It grows a foot or two high. The generic name was given in honor of Lobele, some 240 years since. It is a powerful emetic, resembling tobacco in its effects, but acts in a shorter time. In regular practice it is given in asthma, with some success.

ASCLEPIAS TUBEROSA—BUTTERFLY WEED.

Natural order, Asclepiadaceæ—Linnæan class, Gynandria—Order, Pentandria.

Gen. Char. Calyx small; petals joined at base; reflexed; five-lobed, with five averted horns at the base of the lobes; connate mass of anthers, five-angled, truncate, opening by fine fissures lengthwise; five distinct pairs of masses of pollen; follicles two, ventricose; seeds comose. *Spec. Char.* Stem hairy, branching at top; leaves alternate, sessile, oblong-lanceolate; umbels many, forming large terminal corymbs. It is about two feet or more high, and sends out magnificent orange-colored flowers in August. The pods are filled with flat ovate seeds, packed in with long silky down. The generic name is given in honor of Esculapius, the god of medicine. The root is bitter when dry, and easily powdered. Its dose is fifteen grains. The decoction in water is taken by the wine glass,



BUTTERFLY WEED.

and a still stronger one by the tablespoon. It is given in pleurisy, last stages of inflammation of the chest, catarrh, and other diseases where it is desirable to excite profuse perspiration.

FLORAL DICTIONARY.

In the gardens of the East, Flora receives the homage due for her widely scattered and various gifts. Oh flowers! flowers! we may well think them the "alphabet of the angels." But how coldly do we look on them; how often are we regardless of their charms here; while in other lands they almost subserve the use of writing, expressing by a blossom, joy, grief, hope, despair, devotion, piety, and almost every sentiment that fills the mind.

In Eastern lands they talk in flowers,
  And they tell in a garland their loves and cares;
Each blossom that blooms in their garden bowers,
  On its leaves a mystic language bears.

The Rose is the sign of joy and love,
  Young blushing love in its earliest dawn;
And the mildness that suits the gentle dove
Take 'Jr From the Myrtle's snowy flower is drawn. Em -

Innocence dwells in the Lily's bell,
  Pure as a heart in its native heaven;
Fames bright star, and glory's swell,
  By the glossy leaf of the bay are given.

The silent, soft, and humble heart,
  In the Violet's hidden sweetness breathes;
And the tender soul, that cannot part
  A twine of evergreen fondly wreathes.

The Cypress that darkly shades the grave,
  Is sorrow that mourns its bitter lot;
And faith, that a thousand ills can brave,
  Speaks in thy blue leaves—Forget Me Not.

Then gather a wreath from the garden bowers,
And tell the wish of thy heart in flowers.

Acacia,	Platonic love.
Acacia Rose,	Elegance.
Agnus Castus,	Coldness. To live without love.
Agrimony,	Thankfulness.
Aloe,	Bitterness.
Almond Tree,	Indiscretion.
Almond Laurel,	Perfidy.
Amaranth,	Immortality.
Amaryllis,	Haughtiness, Pride.
American Cowslip,	You are my divinity.
Anemone, Field,	Sickness.
——— Garden,	Forsaken.
Angelica,	Inspiration.
Apple Blossom,	Preference.
A Rose Leaf,	I never importune.
Arum, or Wake Robin,	Ardour.
Ash,	Grandeur.
Asphodel,	My regrets follow you to the grave.
Balm Gentle,	Pleasantry.
Balm of Gilead,	Healing.
Balsam,	Impatience.

Barberry,	Sharpness.
Basil,	Hatred.
Bear's Breech,	Arts (the)
Beech,	Prosperity.
Bee-Ophrys, or Orchis.	Error.
Bilberry.	Treachery.
Bindweed,	Humility,
Black Thorn,	Difficulty,
Bladder-Nut Tree,	Frivolous Amusement.
Blue Bottle Centaury,	Delicacy.
Borage,	Bluntness.
Box,	Stoicism.
Bramble,	Envy.
Broken Straw,	Dissension, Rupture.
Broom,	Neatness.
Buckbean,	Calm Repose.
Burdock,	Importunity.
Buttercups,	Ingratitude.
Candy Tuft,	Indifference,
Canterbury Bell, Blue	Constancy.
Carnation, Yellow,	Disdain.
Catchfly,	Snare,
Cherry Tree,	Good Education.
Chesnut Tree,	Do me justice.

China Aster,	Variety.
China, or Indian Pink,	Aversion.
Cinquefoil,	Beloved Daughter.
Clematis,	Artifice,
Clove Pink,	Dignity.
Colt's-foot,	Justice shall be done you.
Columbine,	Folly.
Coriander,	Hidden Merit.
Corn,	Riches.
Cornelian Cherry Tree.	Durability.
Crown Imperial,	Majesty.
Cypress,	Mourning
—— and Marygold,	Despair.

Daisy,	Innocence,
—— , Garden,	I partake your sentiments.
—— , White,	I will think of it.
Daffodil,	Delusive Hope.
Dandelion,	Oracle.
Dead Leaves,	Sadness.
Dittany of Crete,	Birth.
Dodder,	Baseness
Ebony,	Blackness.
Eglantine, or Sweet Briar,	Poetry.

Enchanter's Nightshade,	Fascination.

Fennel,	Strength.
Fern,	Sincerity.
——, Flowering,	Reverie.
Fir Tree,	Elevation.
Flax,	I feel your kindness.
Flora's Bell,	You are without pretension.
Fraxinella,	Fire.

Geranium, Sorrowful,	Melancholy spirit.
Gillyflower,	Lasting beauty.
Goose-foot,	Goodness.
Grass,	Utility.

Hawthorn,	Hope.
Hazel,	Reconciliation.
Heart's Ease, or Pansy,	Think of me.
Heath,	Solitude.
Hepatica, or Noble Liverwort,	Confidence.
Holly,	Foresight.
Hollyhock,	Fruitfulness.
Honeysuckle,	Bonds of love.
Hop,	Injustice.

Hornbeam,	Ornament.
Horse Chestnut,	Luxury.
Hydrangea,	You are cold.
Hyacinth,	Game, Play.
Ice Plant,	Your looks freeze me.
Indian Jasmine,	I attach myself to You.
Iris,	Message.
——, German,	Flame.
Ivy,	Friendship.
Jessamine, or Jasmine,	Amiability.
Jonquille,	Desire.
Juniper,	Asylum, Protection.
Larch,	Boldness.
Laurel,	Glory.
Laurustine,	I die if neglected.
Lilac,	First emotion of Love.
——, White,	Youth.
Lily, White,	Purity and Modesty.
Lily of the Valley,	Return of Happiness.
Linden Tree,	Conjugal Love.
London Pride,	Frivolity.
Lucern,	Life.
Madder,	Calumny.

Maiden Hair,	Discretion, Secrecy.
Mallow,	Mild or Sweet Disposition.
Manchineel Tree,	Falsehood.
Mandrake,	Rarity.
Maple,	Reserve.
Marvel of Peru,	Timidity.
Madwort, Rock,	Tranquillity.
Marygold,	Inquietude.
———, Small Cape,	Presage.
Meadow Saffron,	My best days are past.
Meadow Sweet,	Uselessness.
Mezereon,	Desire to please.
Michaelmas Daisy,	Afterthought.
Mignonette,	Your qualities surpass your charms.
Misseltoe,	I surmount all difficulties.
Moonwort,	Forgetfulness.
Moschatel,	Weakness.
Moss Rose,	Pleasure without alloy.
Moss, Tuft of,	Maternal Love.
Motherwort,	Secret Love.
Moving Plant,	Agitation.
Mulberry Tree, Black,	I will not survive You.
Mulberry, White,	Wisdom.
Mushroom,	Suspicion.
Musk Rose,	Capricious beauty.

Myrobalan,	Privation.
Myrtle,	Love.
Myosotis, or Mouse Ear,	Forget-me-not.
Nettle,	Cruelty.
Night Convolvulus,	Night.
Nightshade, Bitter Sweet,	Truth.
Nosegay,	Gallantry.
Oak,	Hospitality.
Olive Branches,	Peace.
Orange Flower,	Chastity.
Orange Tree,	Generosity.
Parsley,	Entertainment, Feasting.
Pasque Flower,	You are without pretension.
Periwinkle,	Sweet Remembrances.
Peruvian Heliotrope,	I love you, Infatuation.
Pheasant's Eye,	Sorrowful Remembrances.
Pimpernel,	Assignation.
Pine Apple,	You are perfect.
Pink,	Lively and Pure Affection.
Plane Tree,	Genius.
Plum Tree,	Keep your promises.

Plum Tree, Wild,	Independence.
Poet's Narcissus,	Egotism.
Potato,	Beneficence.
Poplar, Black,	Courage.
——, White,	Time.
Poppy,	Consolation of sleep.
——, White,	Sleep of the Heart.
Primrose,	Early Youth.
——, Evening,	Inconstancy.
Privet,	Prohibition.
Provins Rose,	Graces.
Pyramidal Bell Flower,	Gratitude.
Quaking Grass,	Agitation.
Ranunculus,	You are radiant with charms.
Red Shanks,	Patience.
Red Valerian,	Accommodating Disposition.
Reeds,	Music.
Rest Harrow,	Obstacle.
Rose,	Beauty.
——, Monthly,	Beauty ever new.
——, Wild,	Simplicity.
——, White,	Silence.
——, Hundred leaved,	Graces.

Rosebud,	Young Girl.
———, White,	The heart that knows not love.
Rosemary,	Your presence revives me.
Rose-scented Geranium,	Preference.
Roses, a Garland of	Reward of virtue.
Rush,	Docility.
Saffron,	Excess is dangerous.
Sage,	Esteem.
Scarlet Ipomæa,	I attach myself to You.
Sensitive Plant,	Timidity.
Serpentine Cactus,	Horror.
Service Tree,	Prudence.
Shaking Saintfoin,	Agitation.
Snap Dragon,	Presumption.
Snowdrop,	Consolation.
Spider Ophrys,	Skill.
Spiderwort,	Transient Happiness.
Spindle Tree,	Your Image is engraven on my Heart.
Stock, Ten-week,	Promptitude.
Stramonium, Common,	Disguise.
Strawberry,	Perfect Excellence.

Sun flower,	False Riches.
Sweet-briar, or Eglatine,	Poetry.
Sweet-scented Tussilage,	Justice shall be done you.
Sweet Sultan,	Felicity.
Sweet William,	Finesse.
Teasle,	Misanthrophy.
Thistle,	Austerity.
Thrift,	Sympathy.
Thorn Apple,	Deceitful Charms.
Thyme,	Activity.
Tremella,	Resistance.
Truffle.	Surprise.
Trumpet Flower,	Separation.
Tulip,	Declaration of Love.
Venus' Looking-glass,	Flattery.
Vervain,	Enchantment.
Vine,	Intoxication.
Violet, Blue,	Modesty.
——, White,	Candour.
Wake Robin,	Ardour.
Wall-flower,	Fidelity in Adversity.

Water Lily,	Eloquence.
Weeping Willow,	Melancholy.
Wild, or Dog Rose,	Simplicity.
Willow Herb,	Pretension.
Wood Sorrel,	Joy.
Wormwood,	Absence.
Yarrow,	War.
Yellow Day Lily,	Coquetry.
Yellow Rose,	Infidelity.
Yew,	Sorrow.

GLOSSARY

OF TECHNICAL TERMS.

Acerose.—Needle-shaped.

Anceps.—Two-edged.

Acinus.—A small berry.

Aculeus.—A prickle or sharp point, from the bark.

Acuminate.—Having an open or awl-shaped point.

Adnate.—Growing together.

Aggregate.—Gathered together in fasicles or bundles.

Ala.—A wing attached to seeds, formed of membrane.

Angular.—Formed of, or furnished with angles.

Apetalous.—Plants whose floral development is without petals, are said to be apetalous.

Appressed.—When the limb of a leaf is pressed close upon the stem, or when hairs are laid flat upon the surface of a plant, they are said to be appressed.

Articulated.—Jointed.

Aphyllous.—Destitute of leaves.

Assurgent.—Rising perpendicularly without artificial support.

Awns.—The beards of barley are so called.

Axillary.—Placed in the axilla (arm-pit). A term by which the angle formed by the union of the leaf and the stem is designated.

Bacca.—A berry.

Bifid.—Cut half in two from the summit; two-cleft.

Binate.—With two leaflets.

Bipinnate.—Double rows of leaflets.

Bipinnatifid.—Twice pinnatifid.

Biternate.—Cut into three, twice over.

Bracteæ.—Small leaves placed between the proper leaves of the plant and the flower-cup.

Buds.—Coverings of the germ.

Caducous.—Falling off early.

Capitate.—Growing in the form of a head.

Catkin.—Term used to designate the inflorescence of amentaceous plants, as in the hazel.

Cauline.—Developed on the stem.

Cernuous.—When a plant grows in a nodding, drooping, or pendulous manner, it is termed cernuous.

Ciliated.—Eye-lash haired; bordered with soft parallel hairs.

Colored.—Differing from green, which from its being so common a color is counted colorless in botany.

Comose.—Term applied to a flower shoot which is terminated by barren bracteæ.

Compound.—Several things in one. A compound umbel is formed of several single umbels; the crysanthemum is a compound flower, being formed of many little flowers or florets.

Concave.—Hollowed.

Cone.—A particular kind of compound fruit, such as that of the pine tribe.

Connate.—Situated opposite each other, and joined at the base.

Connivent.—Converging.

Cordate.—Heart-shaped; according to the vulgar notion of a heart.

Corymb.—A bunch of flowers where the footstalks proceed from different parts of the principal axis, but all attain the same height.

Corymbose.—Formed or arranged after the manner of a corymb.

Crenæ.—Notches, or round teeth, bordering a leaf or the petals of a flower.

Campanulate.—Bell-shaped.

Capsule.—A seed box.

Crenate.—Notched; when the teeth are rounded, and not directed towards either end of the leaf.

Crenulate.—Filled with notches.

Culm.—The stem of grasses.

Cuneate.—Wedge-shaped; broad and abrupt at the summit, and tapering down to the base.

Cymbiform.—Having the form of a boat.

Cyme.—A mode of flowering somewhat like a flattened panicle.

Deciduous.—Falling off. Trees shedding their leaves, and the leaves shed annually, are said to be deciduous.

Decompound.—Term applied to a leaf when it is twice pinnated; and to a panicle when its branches are also panicled.

Decumbent.—Lying down.

Decurrent.—When leaves run down the stem to a point considerably below the place where they diverge from it.

Deflexed.—Folded downwards.

Denticulated.—Being finely toothed.

Depressed.—Pressed downwards.

Dichotomous.—A stem that ramifies in pairs.

DIGITATE.—Having the form of an open hand.

DISTICHOUS.—Leaves or flowers placed in two opposite rows are so termed.

DORSAL.—Belonging to the back.

DRUPE.—A fruit enclosing a stone or nut.

EGLANDULOSE.—Without glands.

EGRET.—The hairy crowns of some seeds, as dandelion.

ELLIPTIC.—Nearly oval, but of equal breadth at each end.

ELLIPTIC-LANCEOLATE.—A form between an ellipsis and a lance-shape.

EMARGINATE.—Being slightly notched at the end, as the box leaf.

ENSIFORM.—Having the form of a sword with a straight blade,

EXSERTED.—Projecting out of the flower or sheath.

FALCATE.—Shaped like a sickle, long and crooked.

FASCICLES.—When leaves or flowers grow more than two together they are said to be fasciculated, or in fascicles.

FASTIGATE.—Tapering to a narrow point, like a pyramid.

FILIFORM.—Long and simple. like a thread.

Flexuose.—Having a bent or wavy direction.

Florets.—Little flowers. A term chiefly applied to those which were formerly called compound flowers.

Fuscous.—Of a blackish brown color.

Fusiform.—Radish or carrot-shaped.

Gibbous.—Swelled out commonly on one side.

Glabrous.—Smooth.

Glandulose.—Having small glands on the surface.

Glaucous.—Smooth, of a sea-green color; as the leaf of the holly, &c.

Globose.—Round or spherical, like the orange.

Glume.—A part of the floral envelopes of grass.

Hastate.---Formed like the head of an ancient halbert.

Hepatic.---Liver shaped.

Herbaceous.---Plants whose stems perish annually with the fall of the leaf.

Hirsute.---Rough with hairs.

Hispid.---When the spines on the surface of a leaf are not very visible to the naked eye.

Hoary.---Covered over with white down.

Hypocrateriform.—Salver shaped; a tube expanded into a flat border.

Imbricate.—When leaves are laid one over another, like tiles on a roof, they are said to be imbricated.

Incurved.—Folding inwards.

Infundibuliformis.—Funnel form.

Involucre.—Where the bracteæ, or floral leaves are set in a whorl.

Involute.—Term applied to leaves when rolled inward.

Jagged.—Divided irregularly in many parts.

Juguan.—A yoke, growing in pairs.

Lamellæ.—Term applied to the plates which form the gills of the mushroom; plates.

Lanceolate.—Lance or spear-shaped, as in tulipa sylvestris.

Lateral.—On one side.

Leaflet.—A partial or little leaf, part of a compound leaf; leaves are always called compound when they consist of more than one leaf on a stalk. Leaf, is an expansion of the fibres of the bark for the purpose of exposing a great quantity of green matter, which seems necessary to its functions in respiration; when the stem is green less leaves are required, sometimes from that cause, as in the cactus, none at all. It is divided into three parts---the skeleton or framework being the expanded petiole, the branches of which form ribs, to the different modes of which ramification are owing the various forms of leaves, the pulpy portion holding the green matter, and the cuticle, or skin, that covers all.

LEGUME.---A pod ; applied to the fruit of leguminous plants, such as the pea, &c.

LIGNEOUS.---Plants whose stems become gradually less herbaceous, and of a woody texture, and which survive more than three years the annual fall of the leaf, or which retain their leaves in winter as well as summer.

LINEAR.---Narrow, with parallel sides, as in most grasses.

LUNATE.---Crescent-shaped, like a half-moon.

LYRATE.---Lyre-shaped: cut into many transverse segments, becoming larger towards the extremity of the leaf, which is rounded.

LABIATE.—Resembling lips.

MARESCENT.—Withering.

Membranous.—In texture like a membrane, soft and supple.

Multifid.—Cut into three, four, five, or more, narrow divisions.

Mucronate.—Sharply pointed.

Muricated.—Covered with short sharp points.

Nectary.—Honey cup.

Natant.—Floating.

Nerves—Parallel veins on leaves.

Nutant.—Nodding.

Oval.—Having the figure of an ellipse.

Ovary.—The portion of the pistil which contains the ovules or germs of seeds.

Ovate.—Of the shape of an egg cut lengthwise.

Obovate.—Ovate reversed.

Paleaceous.—Chaffy.

Palmated.—Cut into oblong segments, so as to resemble a hand.

Panduriform.—Fiddle-shaped; oblong, broad at the extremities, and contracted in the centre.

Panicle.—A bunch of flowers, composed of numerous branches of different lengths, each bearing a flower.

Pectinate.—Like the teeth of a comb.

Peltate.—Stalk fastened in the middle.

Perianth.—An inner calyx, immediately surrounding the flower.

Pappus.—The down of seed, to waft it away.

Pedicel.—The footstalk which supports a single flower.

Peduncle.—The common flowerstalk, developed in the axil of a non-radical leaf, or leaf which is borne on the stem and not on the root.

Pericarp.—The vessel which contains the seed.

Persistent.—Term applied to parts of plants which remain, while contiguous parts decay.

Petiolate.—Term applied to leaves supported on footstalks.

Petiole.—The footstalk of a leaf.

Pinnæ.—The segments of a pinnated leaf.

Pinnate.—Term applied to a leaf when cut into many parallel segments, like the rose.

Plicate.—Folded like a fan, or plaited.

Pome.—A pulpy fruit, containing a capsule, as the apple and pear.

Procumbent.—Branches spreading on the surface of the ground if not artificially raised and supported.

Pubescent.—Covered with soft silky hairs.

Pungent.—Stinging or pricking.

Premorse.—Abruptly bitten off.

Perfoliate.—Stalk running through the leaf.

Papilionaceous.—Butterfly-shaped.

Quadrangular.—Having four corners or angles.

Quaternate.—Four together.

Racemes.—When flowers are arranged round a filiform simple axis, each particular ——flower being stalked, they are said to be in racemes.

Radiant, or Radiate.—A flower is said to be radiant when, in a cluster of florets, those ——of the circumference, or ray, are long and spreading, and unlike those of the disk.

Radical.—A term applied to leaves proceeding immediately from the root, as in the daisy.

Recurved.—Folded backward.

Reticulated.—Having the appearance of net work.

Retuse.—Abruptly blunt at the end.

Rugose.—Rough, or coarsely wrinkled.

Runcinate.—Having large teeth pointed backward, as in the Dandelion.

Sagittate.—Shaped like an arrow-head; triangular, very much hollowed out at the base.

Scabrous.—Rough to the touch, opposed to glabrous.

Scales.—Any small developments resembling miuute leaves ; also, the leaves of the involucrum of compound flowers.

Scape.—A stem rising from the root, and bearing nothing but flowers, like the tulip.

Segments.—Portions of anything.

Sericeous.—Having a surface like that of velvet to the touch.

Serrated.—Edged with sharp teeth, like those of a saw.

Sessile.—Said of leaves seated on the stem, without footstalks.

Setaceous.—Bearing some resemblance to the form of a bristle.

Sinuate.—Undulating, or wavy.

Spadix.—Flower stalk developed in a spatha, or sheath.

Spatha.—A simple floral leaf, enclosing the whole inflorescence.

Spatulate.—Having the form of a spatula ; a kind of knife, almost spoon-shaped, but flat.

Spike.—Flowers so called, seated upon a long stalk, as wheat.

Secund.—Hanging one way.

Spinous.—Full of prickles.

Stipe.—The stem of a fern or fungus.

Stipulæ.—Two small leaves, placed usually at the base of the floral leaf, and on opposite sides of the branch.

Striæ.—Small streaks, channels or furrows.

Striated.—When the channels in leaves are perceptible to the touch, but invisible to the eye.

Subulate.—Very narrow at the base, and insensibly verging to a point at the summit. as the juniper leaf.

Supra-Decompound.—Doubly decompounded.

Tendril.—The thread-like appendage to climbing plants, by which they support them selves and twine around other objects.

Terminal.—Ending, or at the top.

Ternate.—Consisting of three leaflets.

Thyrse.—A kind of dense panicle, like that of the lilac.

Tomentose.—Downy, covered with fine matted hair.

Toothed.—Cut so as to resemble teeth.

Trifid.—Cut into three.

Truncate.—Having the end abruptly cut off.

Trifinnate.—Triple rows of leaflets.

Tumid.—Swelling.

Thorn.—An imperfect branch.

Tuberous.—Knobbed.

Umbels.—The round tuft of flowers produced by the carrot, &c.

Unarmed.—Opposed to spinous; free from prickles.

Unguis.—A claw.

Unilateral.—When the leaves are all turned one way, and are all on one side.

Urceolate.—Pitcher-shaped.

Volva.—Wrapper; belonging to mushrooms.

Ventricose.—Inflated.

Verrucose.—Warty, covered with little knobs.

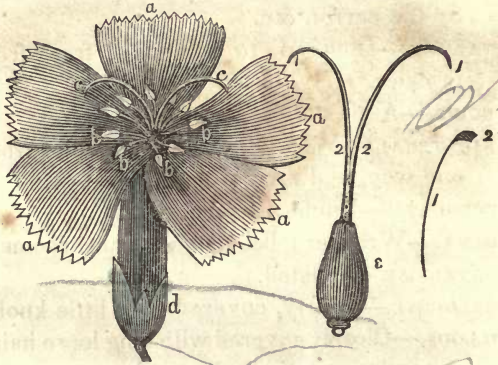
Villous.—Closely covered with long loose hairs. so as almost to hide the surface.

Viscid.—Adhesive, clammy.

Whorls.—Where any parts are set round an axis in the same plane.

ILLUSTRATIONS.

ANALYSIS OF THE CARNATION PINK.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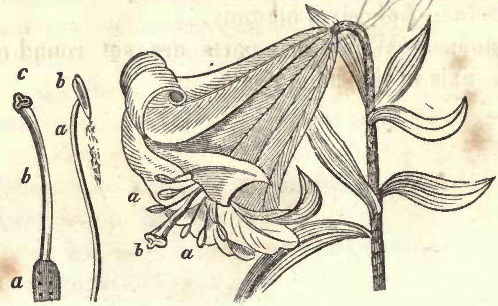
ANALYSIS OF THE CHINESE LILY.



COTYLEDONS OF THE BEAN, WITH ITS GERMINATION.

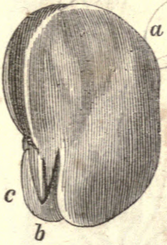


FIG. 1.

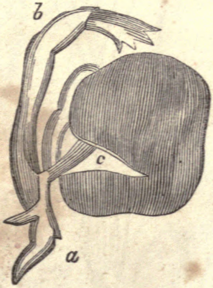


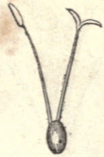
FIG. 2.

Fig. 1.—*a a* shows the cotyledons or cavities for the storing of food for the support of the embryo, *b* and *c*.

Fig. 2.—Embryo germinating: *a* running into the ground to become a root; *b* running up to form a stem; *c* the tube which supplies nutriment from the cotyledons until both roots and leaves are ready to work.

THE SEXUAL SYSTEM, AS FOUND IN THE WORKS OF LINNÆUS.

CLASSES.



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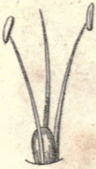
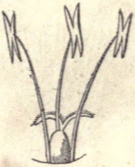


II.



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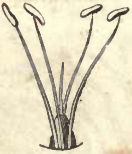
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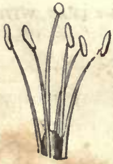
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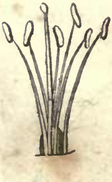
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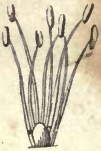
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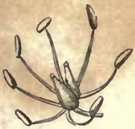
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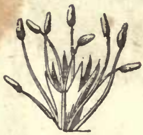
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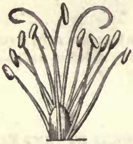
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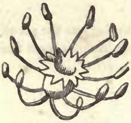
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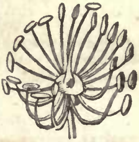
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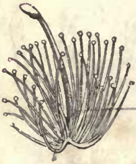
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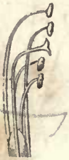
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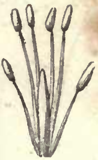
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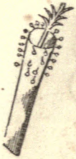
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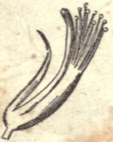
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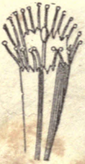
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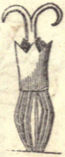
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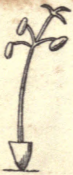
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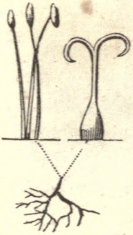
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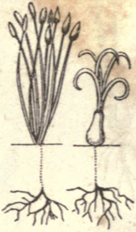
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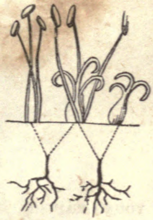
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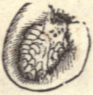
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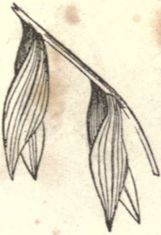
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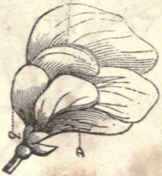
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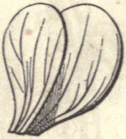
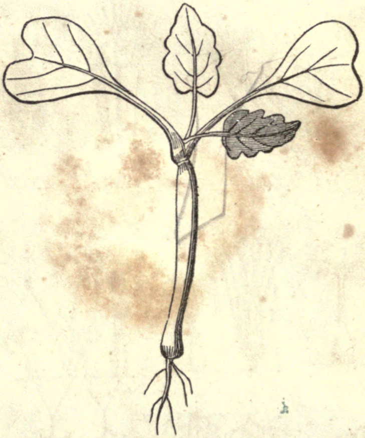
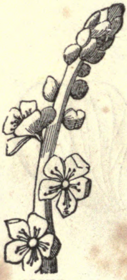




YOUNG RADISH, SHOWING SEED LEAVES.



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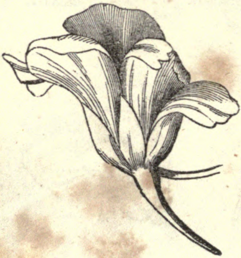
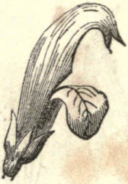


TUBE NECTARY OF NASTURTIUM.



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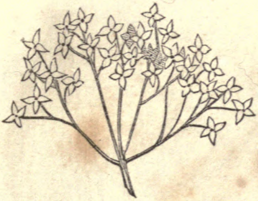

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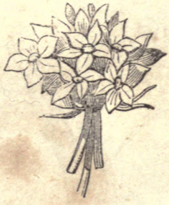

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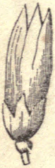

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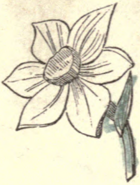

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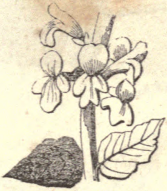

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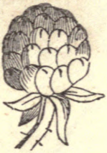

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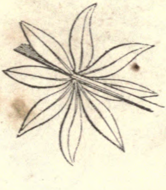

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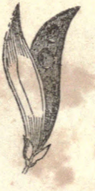

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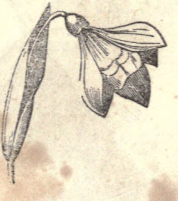

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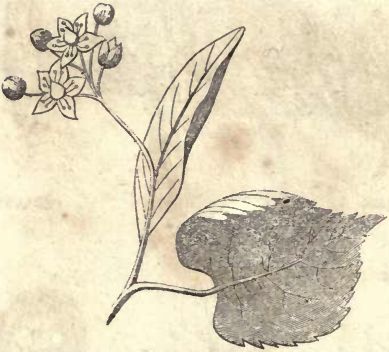

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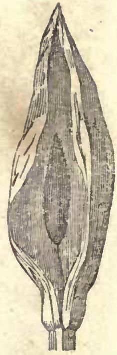

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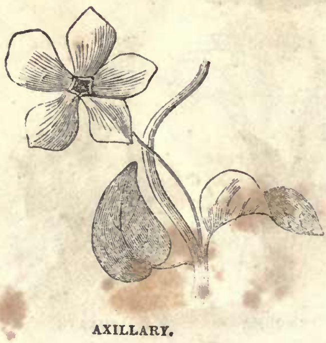

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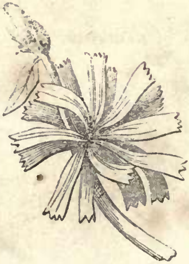

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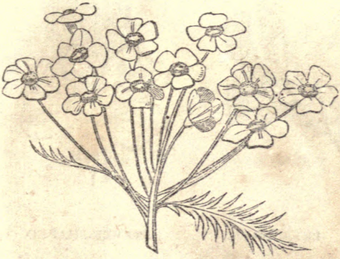

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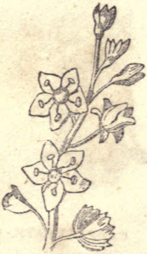

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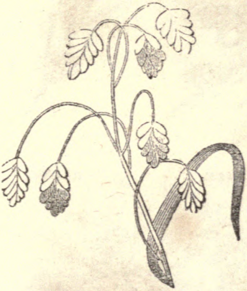

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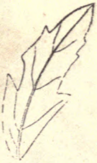

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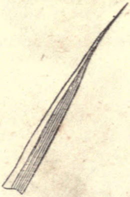

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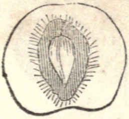

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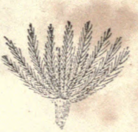

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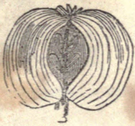

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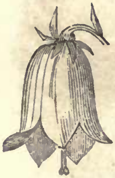

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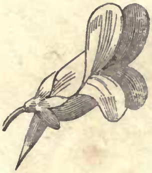

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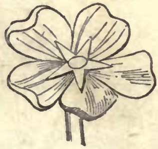

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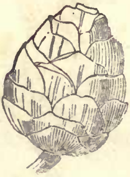

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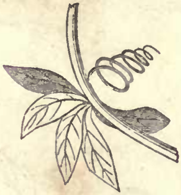

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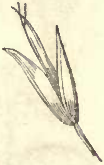

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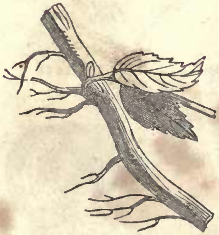

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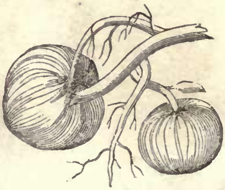

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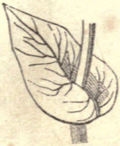

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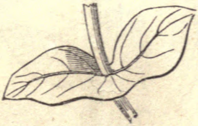

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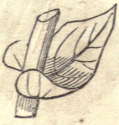

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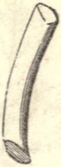

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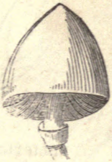

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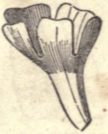

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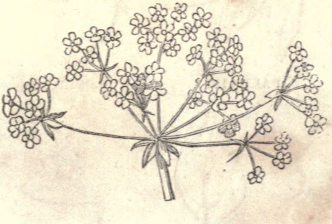

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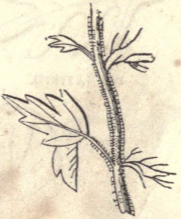
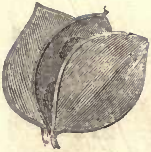


CREEPING STEM



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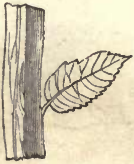

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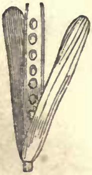

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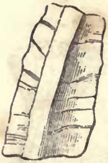

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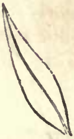

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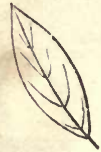

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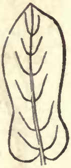

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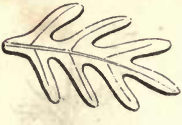

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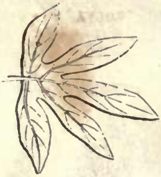

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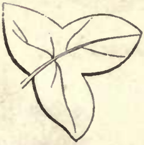

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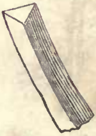

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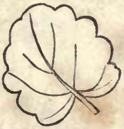

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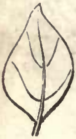

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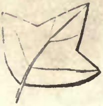

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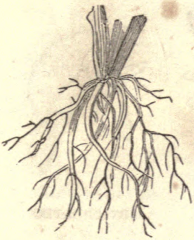
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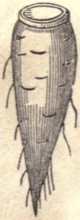
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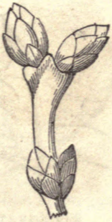
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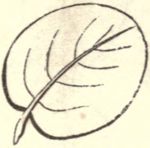
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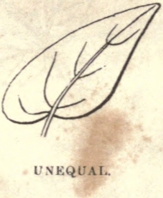
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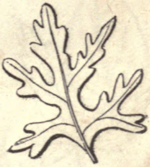
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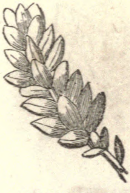
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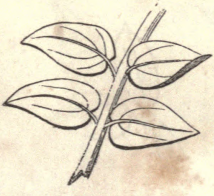
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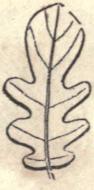
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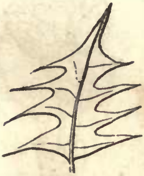

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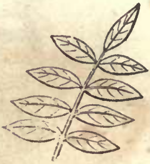

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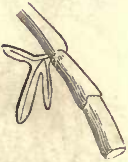

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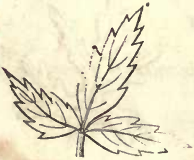

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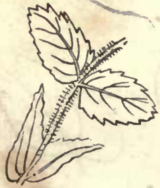

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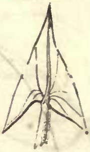

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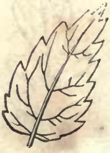

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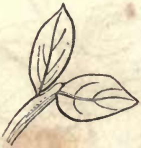

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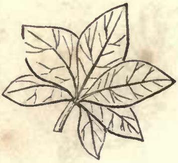

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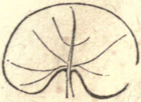

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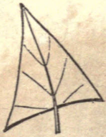

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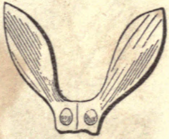

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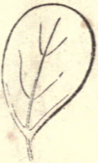

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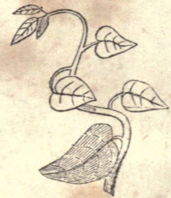

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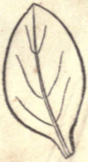

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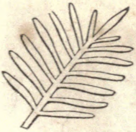

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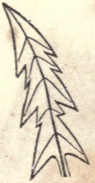

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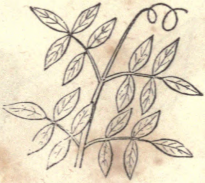

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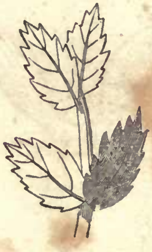

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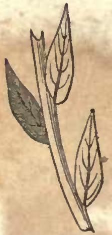

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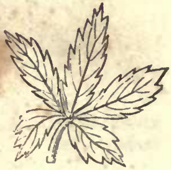

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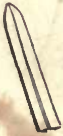

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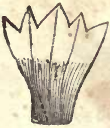

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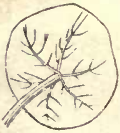

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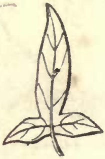

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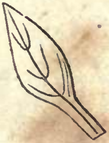

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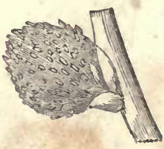

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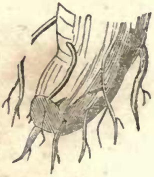

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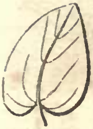

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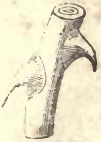

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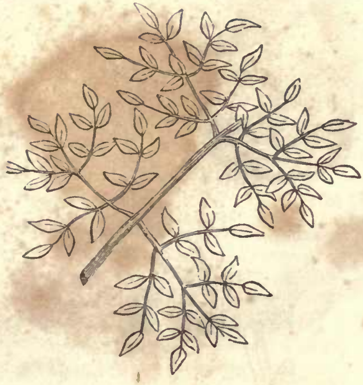

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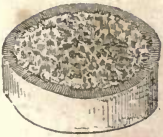

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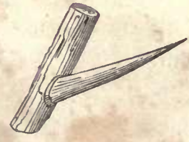

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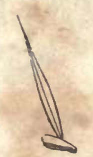

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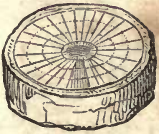

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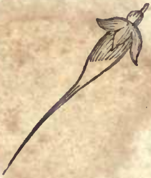

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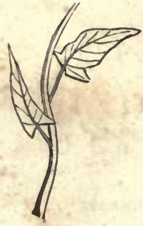

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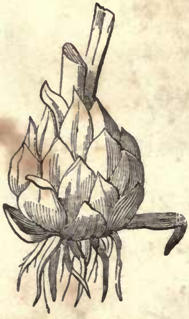

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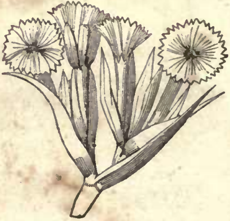

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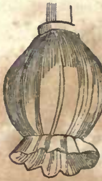

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